

Utility Protests TVA Appliance Selling

WASHINGTON, D. C.—Sales of electric refrigerators by the Tennessee Valley Authority were protested by the Mason Brown Ice & Coal Co., Huntsville, Ala. before the board of tax appeals here last week.

The ice company is seeking re-determination of a \$1,156 deficiency in 1934 income taxes, and maintains the bureau of internal revenue erred in making the assessment by disallowing \$9,873 deducted for excessive depreciation and obsolescence.

The economic life of its property and equipment in Decatur and Huntsville was "materially affected and shortened" by TVA's "yardstick" program for cheap electricity and electrical appliances, the company contended, charging that through the Electric Home & Farm Authority, TVA subsidiary, electric refrigerators were produced and placed on sale at less than one-half the cost of other electric refrigerators. The agency placed refrigerators on sale as low as \$2 down and \$2 a month, the board was told.

The board did not indicate when it would rule on the company's petition.

Loeche Partner in Dallas Air-Conditioning Firm

DALLAS—The Perfection-Aire Air Conditioning Co. has been organized here by Adam F. Loeche, John Campbell, and Jack Walton.

Mr. Loeche was formerly department store sales supervisor for Westinghouse Electric & Mfg. Co.



Joe Takes the Rap BUT HE'S NOT AT FAULT WHEN VALVES CLOG!

Poor Old Joe! They always blame the service man when refrigerator valves clog. And often unjustly! For even with the best handling, even though the mechanism is carefully baked at the factory, moisture may remain trapped in intricate passages, to cause trouble.

The money-saving, time-saving service remedy is Activated Alumina. Activated Alumina adsorbs moisture, takes up and keeps water and water vapor. It is available in convenient cartridges for temporary insertion in the refrigeration system. Thus, moisture is taken out as the refrigerant circulates. Cartridges of Activated Alumina have proved so effective that several makes of refrigerators have them built-in, preventing trouble from moisture-clogged valves once and for all.

ALUMINUM ORE COMPANY.

Sales Agent: ALUMINUM COMPANY OF AMERICA, Pittsburgh, Pennsylvania.



ACTIVATED ALUMINA

PREVENTS CLOGGED REFRIGERATOR VALVES

Westinghouse Introduces Small Planned Kitchen For Apartment Houses

MANSFIELD — A planned appliance kitchen for apartment house use, requiring only a limited space but with facilities and equipment to do a complete cooking job, has been announced by Westinghouse Electric & Mfg. Co.

A feature of the new kitchen is the introduction of a full-sized Westinghouse roaster, used in place of the conventional range or stove as the main cooking unit. Other appliances, such as the coffee-maker, sandwich grill, hot plate, toaster, and waffle maker, supplement the roaster as cooking equipment.

None of these appliances require much storage space, and may easily be kept in the shelf and storage space provided in the kitchen unit.

The apartment-house kitchen is 88 inches high and 72 inches wide, so that it can be built in one end or side of a room. The linoleum counter tops and drainboard are 36 inches from the floor, and a toe-well allows the housewife to stand close to the work surface, eliminating fatigue.

In the top of the backsplash at the base of the work surface two standard electric cords are located for connecting appliances to a source of electricity. This cord is so concealed that only the end plugged to the appliance is visible when the cord is not in use.

When the cord is to be used the operator has only to pull it out of its socket and connect it with the desired appliance. This eliminates the necessity of finding a place to store them, and prevents their becoming entangled with other equipment.

Cabinets for storage purposes are available in steel or wood. Counter tops can also be obtained with linoleum or black Temperprest.

Aside from actual installation in apartment houses, these kitchens are expected to find a use in department store displays, as an inexpensive way of showing electrical appliances in their natural setting. Interest in the compact kitchen has also been developed in summer camps, winter lodges, and seaside cottages, Westinghouse officials report.

The roaster does not require special wiring, and needs only to be plugged into a standard outlet.

Nides-Cloud, Inc. Formed To Handle Stokers

CHICAGO—Three former members of the R. Cooper Jr., Inc. organization have formed Nides-Cloud, Inc. to distribute the Morse coal stoker, manufactured by Morse Chain Co., Ithaca, N. Y., in northern Illinois, four countries in Wisconsin, and two in Indiana.

Sam Nides, formerly Cooper's advertising and sales promotion manager, is president of Nides-Cloud; E. G. Cloud, a former vice president and comptroller, is secretary and treasurer of the new company; and George Mellinger, Cooper's former retail manager, is a vice president.

Other vice presidents of the organization are Harley Barry, former Springfield, Ill. appliance dealer, and E. Reading, who will be in charge of all Nides-Cloud stoker installations.

Opening dealer meeting of the company was held July 14 in the Stevens hotel here, at which the Morse stoker line was introduced and advertising and promotion plans outlined. Included in the company's advertising campaign, said to be one of the most complete ever initiated by a distributor, are full-page advertisements in the Chicago Tribune, and an intensive direct-mail program.

C.I.T. Corp. Opens Branch In Presque Isle, Me.

PRESQUE ISLE, Me.—C. I. T. Corp., sales finance company, has opened a new branch office at 220 Main St. here.

T. W. Singleton, formerly of the Rochester, N. Y. office, will be in charge of the new branch which will serve dealers throughout Aroostook county.

Beaumont Crosley Dealer Moves

BEAUMONT, Tex.—Phoenix Furniture Co., Crosley dealer here, has moved to a new location at Forsythe and Pearl Sts.

M. E. Cutler Heads Sales For Dickerson Co.

NEWARK—M. E. Cutler, formerly manager of the commercial division of Warren Norge Co., New York City, has been appointed sales manager of the Dickerson Co., manufacturer of ice cream cabinets and manifold-type evaporators, announces Andrew W. McCabe, president of the company.

Mr. Cutler has had several years of experience in the ice cream machine industry, having been associated with Davis-Watkins Co., Emery Thompson Co., and Frigidaire Corp.

Plans for an extensive sales expansion program are being formulated by the company, Mr. McCabe says, and equipment has been added to the Dickerson plant to keep pace with increased production.

Servel and Sunbeam Organize Evansville Cooperative League

EVANSVILLE, Ind.—Servel, Inc., manufacturer of Electrolux refrigerators and air-conditioning equipment, and the Sunbeam Electric Mfg. Co., manufacturer of Coldspot refrigerators, have undertaken organization of the Evansville Cooperative League to "promote understanding" of local industrial conditions. A third company holding charter membership in the League is the Hoosier Lamp & Stamping Corp.

Announcement of aims of the new organization has been mailed to members of 75 Evansville civic and professional organizations, and their aid solicited in bettering the city's industrial conditions.

Australian Engineer Studies Air Cooling Here

DETROIT—J. H. Liddle, of the engineering department of Unit Air Conditioners Pty. Ltd., Sydney, Australia, expressed a hope for the lifting of Australian import restrictions on air-conditioning and refrigerating equipment when he visited the NEWS offices last Saturday.

Mr. Liddle is in this country to learn the present trends in air conditioning. Accompanied by his wife, he arrived in San Pedro, Calif., June 14. His tour of inspection includes stays in Los Angeles, Cleveland, Detroit, New York City, and Chicago. He will return to Australia in October.

Associated for three years with F. C. Lovelock Pty. Ltd., Sydney, Australia, Mr. Liddle has written articles on valves and controls for an Australian refrigeration paper.

In Cleveland, Mr. Liddle may be reached in care of Bryant Heater Co., 17825 St. Clair Ave. In Detroit, he is staying at Fort Shelby hotel.

Kelvinator's Regional Men Meet At Factory

DETROIT — Kelvinator's domestic regional and commercial division managers met at the factory last week to hear a mid-summer review of sales accomplishments and to plan for the selling season ahead.

Godfrey Strelinger, assistant to the vice president in charge of sales, was chairman of the domestic regional managers' meeting held July 12 to 14, and J. A. Harlan, sales manager of the commercial division, was in charge of the commercial division managers' conference July 15 to 17.

Sales progress during the current year and plans for the next season were outlined by sales managers for the various departments, including refrigeration, ranges, laundry equipment, commercial air conditioning and automatic heating, and advertising and sales promotion.

Henry W. Burritt, vice president in charge of sales, congratulated the managers on their current record.

WEATHERHEAD PACKLESS VALVES

- Sturdier construction.
- Bellows Equipped.
- Available in two and three way line and angle valves.
- Sizes range from 1/4" to 3/8" in all types.

GENUINE WEATHERHEAD REFRIGERATION PARTS

WEATHERHEAD • 300 E. 131 ST. • CLEVELAND, OHIO



Not one single defective A-P valve returned in almost one year
McKinley Refrigeration Supply Co.
By John McKinley.

JOHN McKINLEY
McKinley Refrigeration Supply Co.
Fort Worth, Texas

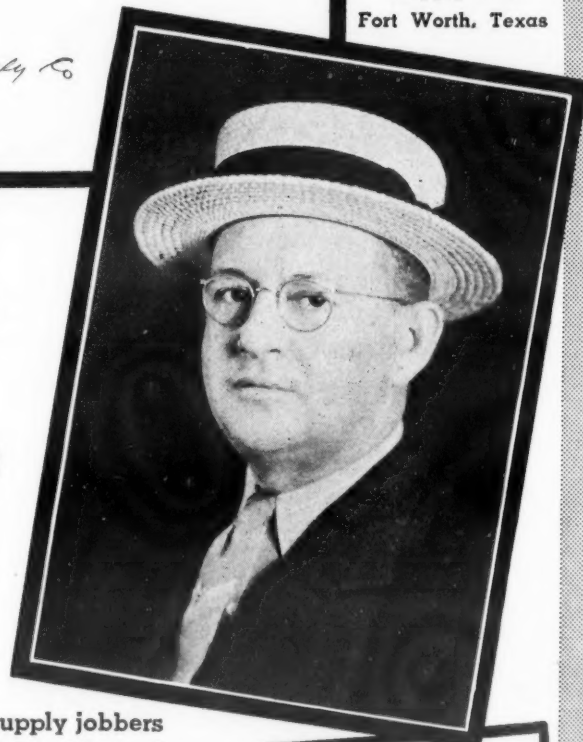
Go to Your Jobber For Your A-P Controls

Freedom from Defects, is inevitable under the careful precision methods with which all A-P Valves are manufactured!

That's why service men, dealers, and supply jobbers everywhere are installing more A-P Solenoids, and Thermostatic Expansion Valves, than ever before! Engineers and service men like the extreme simplicity of A-P Controls... Both the Thermostatic Expansion Valves and 73 RB Solenoid require only a moment to inspect or clean.

A-P Valves satisfy with their dependable operations under all conditions. "Time and Money Savers" — A-P Controls! Use them every chance you have.

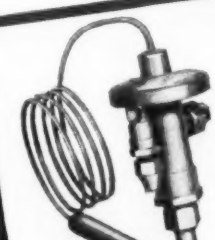
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Stock A-P Controls! . . .



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DETROIT, MICHIGAN, JULY 28, 1937

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Business News Pub. Co.FOUR DOLLARS PER YEAR
TWENTY CENTS PER COPY**Detroit Holding Firm to Control Alco Valve Co.****SEC Approval Sought for Deal Already Approved By Stockholder Votes**

DETROIT—Stockholders of United Specialties Co., holding company for United Air Cleaner Co. (Chicago) and Mitchell Specialty Co. (Philadelphia), have voted to purchase 80% of the stock of Alco Valve Co., St. Louis manufacturer of automatic control devices for refrigeration and air-conditioning equipment.

This purchase, although approved by United Specialties Co. stockholders and agreed to by Alco Valve Co., cannot actually be completed for at least 30 days, since the transaction must have the approval of the Federal Securities and Exchange Commission.

If the proposed sale goes through as planned, United Specialties Co. will hold the controlling interest in Alco Valve Co., but a considerable portion of Alco stock will be retained by those now engaged in the company's management, according to A. B. Schellenberg, Alco's sales manager.

Neither present management nor policies of Alco Valve Co. will be affected by completion of the sale, Mr. Schellenberg stated, nor will the company's operating personnel be changed in any way.

J. L. Shrode will continue as president and general manager of the company. Mr. Shrode, Mr. Schellenberg, and F. D. Turner, secretary-treasurer of the company, will be members of the board of directors. Fred Glover, vice president and director of United Specialties Co., will represent that company on the Alco board.

The transaction, if completed, will give Alco Valve Co. some valuable connections, a greater potential outlet for its products, and available capital for increased expansion and development work, Mr. Schellenberg explained.

Officials of United Specialties Co., besides Mr. Glover, are: Christian Girl, president; Courtenay D. Allington, vice president; M. D. Harrison, secretary-treasurer. In addition to these men, the company's directors include John T. Beatty, Ernest K. Williams, and George Brill.

United Air Cleaner Co. makes air cleaners for automobile and tractor carburetors, while Mitchell Specialty Co. manufactures parts and accessories for automobiles, including dovetails, coincidental locks, electric cord reels, rolled shapes, and ignition switches.

Birmingham Sales Run 30% Ahead of 1936

BIRMINGHAM, Ala.—Electric refrigerator sales in Birmingham are running 30% ahead of last year, according to figures for all outlets compiled by Birmingham Electric Co. A total of 6,129 units were sold during the first six months of this year, a gain of 1,200 units over sales for the same period in 1936.

Gov. Horner Vetoes Tax Authorization Bill

CHICAGO — Declaring that it would mean needless expense for refrigerator owners, Gov. Horner of Illinois recently vetoed a bill passed by the state legislature authorizing cities to tax, license, and regulate the construction, installation, operation, remodeling, dismantling, repairing, and servicing of refrigerating mechanisms.

NRDGA Seeks to Cut Appliance Credit Period

NEW YORK CITY—A plan by which department stores will reduce the credit period on major electrical appliances from 36 to 24 months is being prepared by the credit management division of the National Retail Dry Goods Association, according to Anton Hagios, manager.

"The period of 36-months now prevailing on oil burners, refrigerators, and other appliances, is excessive," Mr. Hagios declared. "We believe that a reduction can be made by fall on these appliances to 24 months, and that by next spring a reduction to 18 months may be achieved on electrical appliances. The 18-month period is our goal."

Details of the credit program being drawn up by the division are to be sent to the association's board of directors for approval, according to Mr. Hagios.

Mr. Hagios stated that it is impractical to set credit period limits on specific items of merchandise, but indicated that there should be reductions on other goods, comparable to those proposed for appliances.

Air Conditioning Cited as Cities' Defense Against Wartime Gas Attacks

WASHINGTON, D. C.—Air conditioning was held out as hope of the modern city against possible wartime poison gas attacks in a report of the National Resources Committee presented to President Franklin D. Roosevelt July 22.

A section of the committee's report on "technological trends and national policy" prepared by Dr. Harrison E. Howe, editor of Industrial and Engineering Chemistry, exploded the fear that chemical warfare could wipe out cities in a few hours during the next war.

"Those in chemical warfare do not foresee the destruction of cities by gas from the air, and the experienced military man still prefers the high-explosive bomb and shell for such destruction," Dr. Howe said. "They destroy physical equipment like power houses and factories, bridges and railway terminals, whereas an informed city, especially in these days of air-conditioned rooms and buildings, could rid itself of chemicals, which are in fact liquids or solids, in most cases without great difficulty."

At Last! An Official Refutation of Claims Made Against Mechanical Refrigeration

Is there greater dehydration of foodstuffs in a mechanical refrigerator than there is in a non-mechanical refrigerator? Is 45 to 50° F. the one established standard temperature at which perishable foods can be preserved in household refrigerators, and are temperatures lower than 45° F. detrimental to foods? Does the water in ice cube trays absorb gases or food odors that may possibly form inside the refrigerator?

Salesmen of mechanical household refrigerators have been giving an emphatic "no" in answer to these questions for years, but the agents for competing forms of refrigeration have continued to make claims that raised such questions in the minds of prospects. Thus, mechanical refrigerator salesmen have long hoped for some independent authority to investigate the matter and to make the findings a matter of public record.

That hope has been realized in the Federal Trade Commission's "findings as to the facts and conclusions" in "the matter of the Coolerator Co." The FTC has just ordered the Coolerator Co., an icebox manufacturer, to cease and desist from making unfairly disparaging statements about mechanical refrigerators.

But it is the FTC's findings of facts in this case that are really important to the mechanical refrigeration industry, for they will go a long way in putting to rest forever the ungrounded claims made against mechanical refrigerators. You'll find these "findings as to fact" published on pages 6, 7, and 8 of this issue, along with the text of the FTC "cease and desist" order.

Air Control's Benefits For Hay Fever Victims Shown in New Research

NEW YORK CITY—Victims of hay fever and other respiratory ailments assure themselves of a "high degree of benefit" through air conditioning, says Prof. F. H. Hodgson, department of allergy botanist at Roosevelt hospital.

Results in the chief test of a series conducted by Prof. Hodgson showed the pollen count in a room reduced from 1,050 to 2 per square centimeter, in 10½ hours.

Using a Carrier portable air-conditioning unit, Prof. Hodgson conducted his tests in a room where the air was heavily saturated with dust and pollen.

At regular intervals the amount of pollen remaining in the room was counted on an exposed slide. Four and a half hours after the experiment was begun, the pollen count had been reduced from 1,050 to 70; three hours later, the count had dropped to 5. Ten and a half hours from the start of the experiment the count was only 2.

All counts were carefully made to insure exact comparisons of situation. (Concluded on Page 2, Column 4)

Air Cooling Forces New Detroit Water Main

DETROIT—Urgent need for additional water supplies to serve air-conditioning equipment in downtown stores and buildings is one of the principal reasons for the installation of a new, 16-inch water main along Woodward Ave. from Grand Circus Park to Fort St.

The Board of Water Commissioners has provided a sum of \$20,000 for the installation of the new pipe, which has four times the capacity of the main which has been used since 1870.

Indianapolis Hospital Extends Cooling System

INDIANAPOLIS — Success of an air-conditioning system installed last summer on the surgical floor of the Methodist hospital here has brought extension of the system to the maternity floor where it is now in effect in the three nurseries, four delivery rooms, and labor rooms.

On the surgical floor, 15 surgeries, doctors' and nurses' scrub rooms, corridors, and work rooms are air conditioned.

Nash-Kelvinator Acquires Control Of Electromaster

DETROIT—Acquisition by Nash-Kelvinator Corp. of 55% of the common stock of Electromaster, Inc., will not affect either the management or policies of the latter company, according to George W. Mason, Nash-Kelvinator president. Mr. Mason declared that "the management, policies, and practices of Electromaster will remain the same."

"We consider our holdings in Electromaster as a sound investment in the electric range industry, which is responding to increased public demand at this time," Mr. Mason explained.

According to Mr. Mason's announcement, Electromaster will continue to promote its own business of making and distributing nationally the Electromaster line of ranges and water heaters, and will continue to make ranges for Kelvinator.

R. B. Marshall, president and general manager of Electromaster for the past four years, will continue in active charge of the company's affairs. Nash-Kelvinator will be represented by two directors on Electromaster's seven-man board.

That Nash-Kelvinator Corp. had acquired a controlling stock interest in Electromaster, Inc. recently was disclosed in a Nash-Kelvinator report to the securities and exchange commission. This report was made public at the stock exchange.

The report stated that Nash-Kelvinator acquired 50,040 shares of unissued \$1 par value capital stock of Electromaster in accordance with an option and also bought from a stockholder 26,592 shares and \$156,462 of 6% convertible income notes, which were converted into 31,292 shares of stock.

These purchases gave Nash-Kelvinator 55.27% of Electromaster's capital stock as of June 30.

Neither the price paid nor the stockholder's name was made public.

Electromaster's sales for 1936 amounted to \$1,592,492. Nash-Kelvinator's President Mason also is a director of Electromaster.

Michelson Heads Crosley Public Relations Work

CINCINNATI—Charles Michelson, director of publicity for the Democratic National Committee, has been retained by Crosley Radio Corp. as public relations counsel, officials of the corporation announced last week. He will also continue to direct the Democratic party publicity.

Mr. Michelson's publicity and press relation efforts have been credited by some observers as being one of the main factors in the political success of the Democratic party since 1932, and it is also believed that he has assisted in the preparation of many of President Roosevelt's addresses to the public.

Air Conditioning Fills Apartment House to The Top & Brings Nice Return on Investment

BIRMINGHAM, Ala.—Dollars and cents value of air conditioning to an apartment house owner is being amply demonstrated in the case of the Country Club Plaza, a \$150,000 12-unit structure here.

The building has been 100% rented since erection, there is a waiting list of tenants, and the landlord is realizing an income of 7½% on the investment. It is one of the first new air-conditioned apartment houses in the country, erection having begun early in 1936.

"Most everybody told us in June 1936 that we were crazy to air condition an apartment house, that the rentals could not be increased enough to take care of installing and maintaining the equipment," said

Tyler Purchases Dry-Kold Plant; Plans Expansion**New Factory to Be Used For Manufacture of Walk-in Coolers**

NILES, Mich. — Tyler Fixture Corp., manufacturer of commercial refrigerators and all-steel fixtures for food stores, has bought the former Dry-Kold Refrigerator Co.'s plant and machinery at 407 N. Front St. here from Dallas E. Winslow, Inc., Detroit firm which purchased the Dry-Kold holdings earlier this year. Announcement of the acquisition was made by Jerry Tyler, president and general manager of the fixture company.

The transaction marks Tyler's second increase in plant space in 10 months, the company having built a \$40,000 unit here in the fall of 1936 to add almost 50% more to its total floor space. The Dry-Kold factory has a floor area of 29,000 sq. ft.

Remodeling of the plant, which has been inoperative for the greater part of the year, will begin immediately, and production of a complete line of walk-in coolers for meat storage and additional articles formerly made by Dry-Kold will start as soon as possible, according to Mr. Tyler.

In buying the old Dry-Kold property, the Tyler company spiked a rumor that it planned to establish a branch factory in the east. Mr. Tyler said that instead his firm would ship merchandise from the factory here to its leased storage rooms on the third floor of the Starrett-Lehigh building in New York City.

The Dry-Kold Refrigerator Co. was reorganized in May, 1936, when an audit of its books revealed a reduced cash position, said to have

(Concluded on Page 2, Column 5)

Dayton June Sales Up 11% Over Last Year

DAYTON—Retail sales of electric refrigerators here during June showed a gain of 11% over the same month last year, according to reports from 67 dealers. Sales for the first six months of the year showed a 27% increase over first half of 1936. Seventy-one dealers reported last year.

Gas refrigerator sales here during June were 19% below the June, 1936 level. For the half-year period, sales showed a 3% drop from last year's six-month report.

Refrigerators were the only electrical appliance to show a sales gain during June. Radios were off 24%, washers were down 10%, and ironers dropped 22%. Range sales showed no change.

J. Warren Leach, president of J. Warren Leach & Co., real estate concern handling the property.

"Well, air conditioning has proven the big drawing card. The building was completed Dec. 24, 1936, and immediately filled, although an off season for rentals. We now have a waiting list to fill any vacancy."

"From the overflow of tenants we were able to rent one or two vacant apartments in the Country Club Terrace, a companion building located nearby, but which is not air conditioned. We now expect to air condition this building. The air-conditioned apartments (five and six rooms) rent for \$10 to \$15 more per month

(Concluded on Page 11, Column 1)

A Salesman's Idea of Prospects



These two displays on the floor of a Chicago Frigidaire dealer caught the eye of Bonnie Donahue (left) and Madeleine Shannon, Northwestern University students. Top demonstration, featuring a 75-lb. block of ice around the evaporator, is intended to prove Frigidaire's contention that the

unit "makes ice cheaper than you can buy it." The thermogauge on top of the display shows a reading of -5° F. Below is the Frigidaire "tumble-test," designed to make it easy for prospects to see the "meter-miser" compressor under the cabinet, and to show cabinet construction.

First Kelvin Home in Akron Opened July 22

AKRON, Ohio—First Kelvin Home in this city was opened July 22 in the presence of civic officials and organizations when L. G. Estep, head of Nash-Kelvinator Corp.'s Kelvin Home division, presented the home to Mayor Lee D. Schroy.

The home, constructed by M. L. Freeman Co., was then opened for inspection. Members of the chamber of commerce, real estate board, builders exchange, and similar organizations were the first to be conducted through the building.

Construction of two more Kelvin Homes is being started immediately, according to Mr. Freeman, of the building concern.

Herz Opens Larger Appliance Dept. in Terre Haute

TERRE HAUTE, Ind.—A new and enlarged electrical appliance department has been opened in the Herz store here. Leonard and Servel Electrolux refrigerators are featured.

\$2,700,433 Earned By Nash-Kelvinator

DETROIT—Directors of Nash-Kelvinator Corp. last week voted a dividend of 25 cents per share, payable Aug. 20 to stock of record at the close of business on Aug. 2.

For the six months ended May 31, net earnings of Nash-Kelvinator Corp. were reported at \$2,700,443.23. This includes earnings of the Kelvinator division from Jan. 4 only.

For the quarter ended May 31, net earnings were \$1,990,880.03. While consolidation of Nash and Kelvinator was not effected until Jan. 4, 1937, combined earnings of the companies for similar periods of the preceding year would have shown \$2,010,533.69 for the period to May 31, 1936, and for the quarter ended at that time would have shown \$1,944,802.50.

Because of the change in the fiscal year and the reporting of subsequent profits on the basis of quarters ending Dec. 31, March 31, and June 30, the company also reported profits for the seven months to June 30 of \$2,810,972.52, as compared with aggregate profits of the separate companies for the same period of the preceding year of \$2,305,023.46.

Extra Servel Dividend Voted

NEW YORK CITY—Servel, Inc. directors on July 20 voted an extra dividend of 60 cents and the regular quarterly dividend of 25 cents, both payable Sept. 1 to stock of record Aug. 18. The previous disbursement was 25 cents regular dividend on June 1.

Tests Show Efficiency Of Air Conditioning As Pollen Removers

(Concluded from Page 1, Column 2) tions of exposure, etc., in all of the experiments. The micro-slide method provided for the identification of pollen as well as the count.

In one test conducted in a pollen-impregnated room, seven hours of using the Carrier air conditioner resulted "in a reduction of practically 99% of the pollens and 98% of the visible dust," Prof. Hodgson said.

He then ran a test under unusually extreme conditions where a heavier discharge of pollens and dust was blown into the room, the air agitated and the unit turned on for five hours, without definite effort to keep the room closed, except for windows.

Tests showed that at the end of five hours in an unconditioned room the average pollens per square centimeter were 224 and the dust particles 175; while in the air-conditioned room, average pollens per square centimeter were only 10 and dust particles 22.

"Under these more severe conditions, more than 95% of the pollen was removed in five hours and about 88% of the dust," he stated.

"Results of the experiments," concluded Prof. Hodgson, "show that the efficiency of the air-conditioning device is sufficient to insure a high degree of benefit to a patient suffering from exposure to air containing such irritants as house dust and natural pollens."

Tyler Fixture Buys Dry-Kold Plant

(Concluded from Page 1, Column 5) been caused by the alleged embezzlement of funds by a company employee.

An executive committee consisting of two creditors and a former director, all of whom were elected members of a new board of directors, reorganized the management and directed the affairs of Dry-Kold following the audit, which was instigated by W. F. Harrah, one of the principal stockholders.

Under the control of a committee of creditors, the company remained active for about a year until its holdings were bought by the Winslow organization, which is the parent firm of the Copeland Refrigerator Corp.

The sale of the North Front St. property by the Winslow firm to the Tyler company completed several months' negotiations and marked another step in the latter organization's expansion. It followed by two weeks the announcement of a stock sale and organization of the Tyler Fixture Corp. as successor to the original Tyler Sales Fixture Co.

Capitalization of the new corporation was set at \$342,000, of which \$188,000 in stock went to stockholders in the original company, the balance being offered to the public.

Besides Mr. Tyler, other officers of the new corporation are: George Mayhew, secretary-treasurer and director; L. L. Tyler, Alma, Mich., vice president and director; Earl W. Kent and Philip A. Hadsell, Niles, and Raymond R. Beardsley, Muskegon, Mich., directors.

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AUTOMATIC and THERMOSTATIC EXPANSION VALVES



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No. 782 Strainer



No. 785



No. 781

DETROIT Thermostatic Expansion Valves cover the full range of your needs . . . in fact this is the most complete line of valves made by any one manufacturer in this country. Capacities range from the valve needed on a small domestic box to that needed for a 20 ton air conditioning unit. All are built to the same high precision standards.

When you standardize on Detroit Valves you avail yourself of all the advantages of gas charging . . .

greater sensitivity, instant action, no temperature lag, no motor overload in starting, perfect balance throughout the system.

Delubaloy needles and seats assure greater resistance to wear and corrosion . . . provide tight closure.

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For detailed information on these popular valves write for Technical Bulletins 71 and 82.

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Even after a full day's work with WOLVERINE (Extra Soft) Copper Refrigeration tubing, made soft to make your job easier and better.

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"Yes, that's right—Copelands. We tried them in three of our stores and the results were so completely satisfactory that we now have installed them throughout our entire chain."

That's the way Copeland users talk. And that's why Copeland Commercial Refrigeration units are so easy to sell.

Write for our Sales Plan

COPELAND

REFRIGERATION CORPORATION . . . DETROIT, MICHIGAN

Faden Becomes Byler's Asst. at Edison G-E

CHICAGO—Appointment of H. C. Faden as his assistant has been announced by A. D. Byler, vice president and general manager of Edison General Electric Appliance Co.

Mr. Faden will be concerned with coordination of sales estimates, manufacturing orders, factory schedules, material purchases, and allocation of work among factories.

Other factory personnel changes, as announced by Mr. Byler, include appointment of I. A. Rose as director of purchase and production, and of A. H. Behnke as his assistant. Succeeding Mr. Rose as chief inspector is W. Uhler. E. M. Shaw, superintendent of maintenance, has assumed the added duties and title of construction engineer.

Westinghouse Round-up Held at Henderson, Ky.

HENDERSON, Ky.—Westinghouse dealers, salesmen and their wives from southern Indiana, Illinois, and northern Kentucky attended a "round-up" and barbecue here recently. A general merchandise meeting in the afternoon was followed by an evening program of entertainment.

R. E. Clawson, merchandise supervisor, and J. H. Richards, manager of Westinghouse Electric Supply Co., Evansville, Ind., were in charge of the event.

Officials taking part in the event included Al Cruciger, central division sales promotion department, and K. W. Berkey, refrigeration supervisor, both of Mansfield; C. M. Kopf, sales promotion department, Westinghouse Electric Supply Co., Chicago; C. H. Moran, laundry equipment supervisor, and Miss Alice Turner of the factory home economics institute.

306 Farm Homes Get Electricity In Huntington, Ind. Area

HUNTINGTON, Ind. — Development of rural electrification in this section is indicated by report of Contracting & Materials Co., builders of the Huntington Rural Electrification Membership Corp. distribution system, that 306 homes have been connected with service wires, 595 transformers installed, and 296 miles of posts set.

Feeder lines on "A" and "B" circuits have been completed in the southern section of Huntington county by Northern Indiana Power Co., but power will not be supplied until a substation has been constructed and the project is finished.

Indiana Utility's Sales Up 46% over 1936

INDIANAPOLIS — Public Service Co. of Indiana has added 7,800 customers so far this year, and sold a total of \$653,000 worth of electrical merchandise, an increase of 46% over the figure for the corresponding period in 1936, officials report.

Brown-Camp Hardware Co. New F-M Distributor

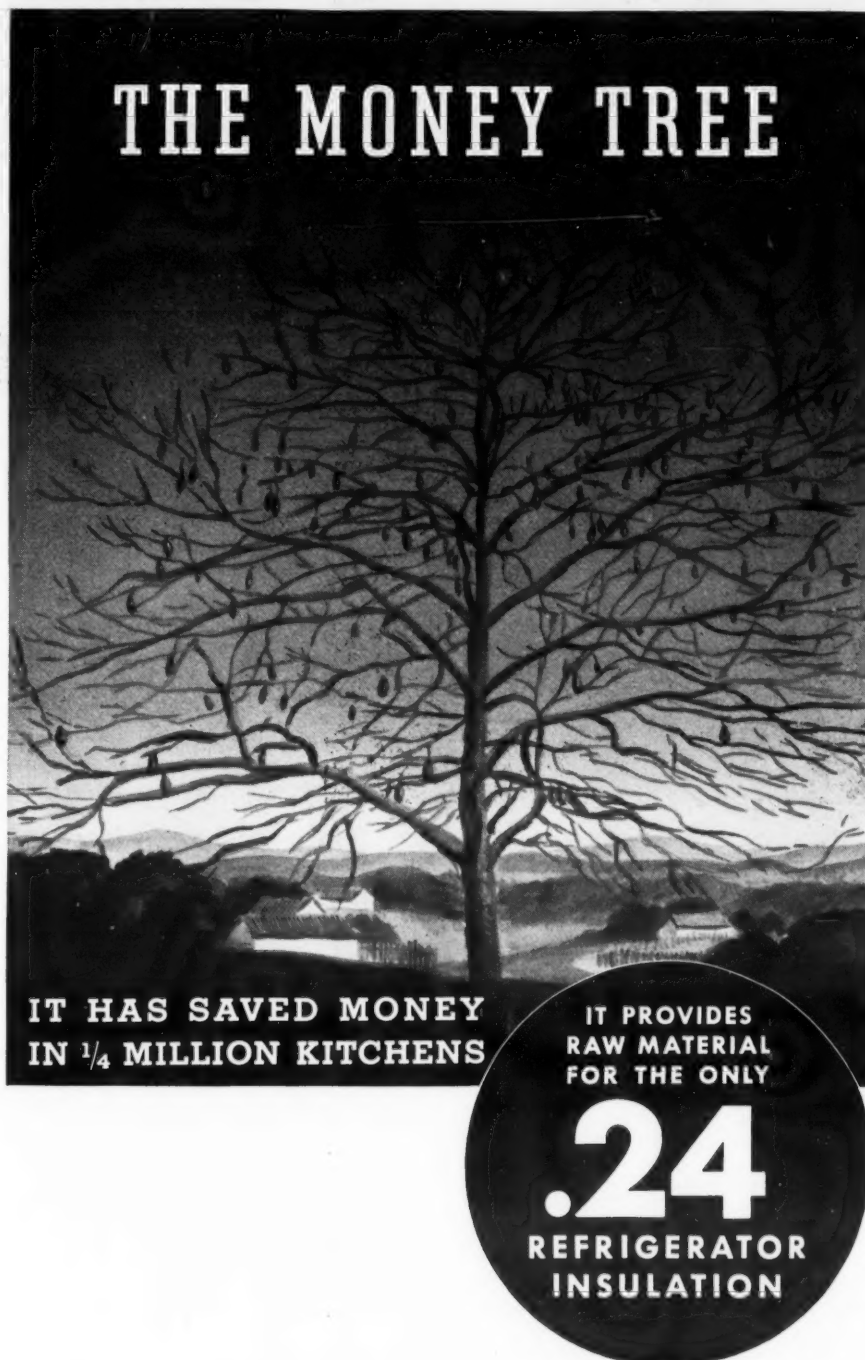
DES MOINES — Brown-Camp Hardware Co. has been appointed Iowa distributor for Fairbanks, Morse & Co. for refrigerators and other household appliances. W. T. McNerney is vice president and general manager of the firm.

Wisting Gains Presidency of Portland Electric Club

PORTLAND, Ore.—George Wisting is the new president of the Portland Electric Club. He succeeds Verne Miller whose resignation automatically became effective in accordance with the organization's by-laws. Mr. Wisting will serve during the second half of the year.

Vacuum Cleaner Sales Total 136,539 in June

CLEVELAND — Vacuum cleaner sales for June totaled 102,153 floor units and 34,386 hand units, according to reports from manufacturers to E. Murray of the secretary's office of Vacuum Cleaners Manufacturers Association.



THE MONEY TREE

IT HAS SAVED MONEY
IN 1/4 MILLION KITCHENS

IT PROVIDES
RAW MATERIAL
FOR THE ONLY
.24
REFRIGERATOR
INSULATION

● This tropical tree, the Ceiba, saves housewives hundreds of thousands of dollars yearly. The unique fibres from its giant seed pods, processed into Dry-Zero Insulation, become the most efficient refrigerator insulant commercially available.

Dry-Zero Insulation keeps more heat out of refrigerators than any other material, so less electricity is needed to cool them, thus making them cheaper to operate. And, unlike other materials used for insulation, Dry-Zero Insulation does not absorb moisture, keeps its efficiency indefinitely and does not lose its heat-stopping ability. That's why Dry-Zero Insulation saves the owner from 20c to \$2 every month.

WHAT .24 MEANS TO REFRIGERATOR DEALERS

This figure is the measure of the heat-stopping efficiency of Dry-Zero Insulation. It is better than any other. To dealers it means a plus value to the argument of refrigerator economy. For it means that less heat will get into the refrigerator, making it less costly to cool. Dry-Zero Insulation in **your** refrigerator gives you a story of economical operation that should help you sell over any other refrigerator not insulated with this quality material. It costs more to use but gives the owner much more value.

DRY-ZERO
INSULATION
The Most Efficient
Commercial Insulant Known

DRY-ZERO CORPORATION

222 North Bank Drive
CHICAGO, ILL.

687 Broadview Avenue
TORONTO, ONT.

Will you be in on



Enjoying pleasant relief from humid heat with Northwind

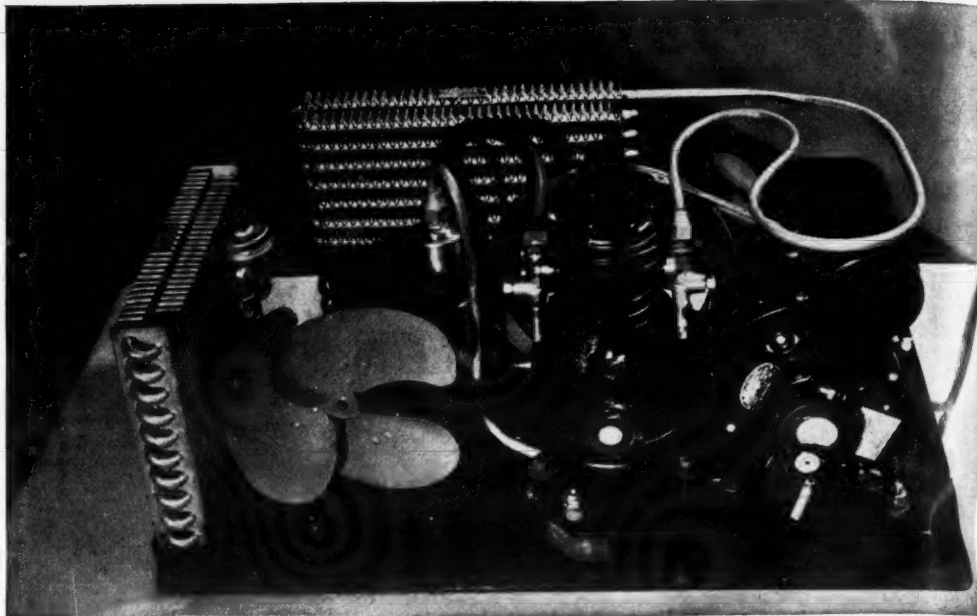
Now You Can Enjoy the Pleasure of Perfect Summer Air Conditioning

You will welcome the cool, dehumidified, pleasant air Northwind brings to your home. Gone is the heat and sticky humidity of mid-summer—instead soothing, refreshing relief for you.

Guests for bridge, a dinner party, old friends dropping in for a visit—all will sparkle with lively gaiety in such a fresh, invigorating atmosphere. Banished the tired feeling that so frequently is an unwelcome part of entertaining in summer heat.

Northwind cleans, dehumidifies, deodorizes and circulates over 300 cubic feet of cooled air a minute. It renders pleasant relief from humid heat, absorbing heat and moisture in the room air by electric refrigeration. When Northwind is installed street noises are shut off as well as if the window were closed—all the fresh air you want—noise, dust, soot and drafts forgotten.

Northwind also renders the greatest summer comfort of all—a cool room for truly refreshing sleep. On rainy nights it gives plenty of fresh air—and dampness can't get in. The recipe for relief from humid summer heat is—Northwind.



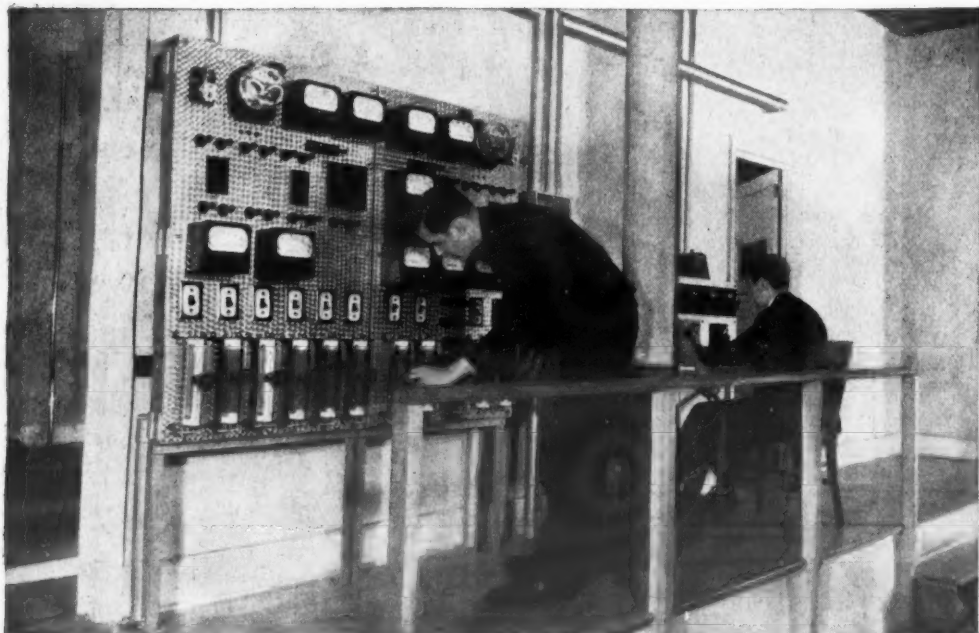
Side view of Pleasantaire unit with cabinet removed

The NORTHWIND is a Marvel of Efficiency and Dependability

Efficient, small, compact—weighing only 140 pounds—Northwind cools, cleans, dehumidifies, deodorizes and circulates over 300 cubic feet of air a minute—and shuts out street noises. Northwind comes in a handsome cabinet of steel with a baked enamel finish—blends easily into any room.

A motor driven fan in the cooling and dehumidifying chamber draws air from the room through the cold coil where both heat and moisture are extracted and cooled, healthfully conditioned air is poured into the room at the rate of over 300 cubic feet a minute.

Heat and moisture extracted from the air within are dissipated into the outside air. This unique method of operation disposes of both heat and moisture—eliminates any plumbing connections present in many air conditioning systems.



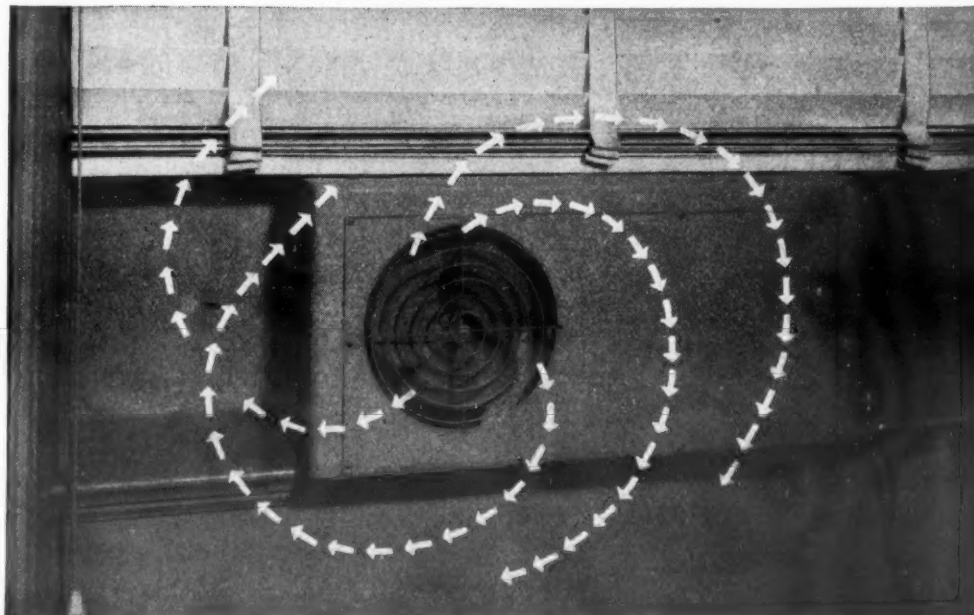
At the control board in the Electrical Testing Laboratories

NORTHWIND Efficiency Proved at Electrical Testing Laboratories

Not content with our own engineering tests, the Pleasantaire Corporation had "Northwind" effectiveness checked by Electrical Testing Laboratories where a cottage type of "Test House" is provided in a cork-insulated, conditioned weather-space. (See "Heating and Ventilating," May 1934.) This Test House represents two rooms, each 14 ft. by 14 ft. by 8 ft. 6 in., at one end of a typical bungalow of wooden construction. Each room is fitted with three windows opening into the weather-space. In addition there is a connecting door between the two rooms, and a door from each room into the laboratory. A single "Northwind" unit was installed in one of the windows of one of these rooms. All doors and windows were closed and 95°F summer weather was produced in the weather space and maintained for 16 hours. In order to simulate air leakage conditions, this warm humid "outdoor" air was drawn into the rooms at the rate of one complete air change an hour. At the end of this period the indoor air was at 86.8°F, 66 per cent relative humidity.

The "Northwind" unit was then plugged in at the baseboard convenience outlet (115 volts). At the end of the first hour of operation the average room temperature had dropped 2.9° F (14.5° F below "outdoor" temperature) while the relative humidity had fallen to 52 percent. At the end of the seven hour test, during which time the "outside" air temperature had increased to 100.3° F, the "Northwind" unit reduced the inside room temperature to 82.8° F (17.5° F below "outdoor" temperature) and the relative humidity to 50 per cent.

Full data on this test and other comprehensive tests conducted by Electrical Testing Laboratories, are included in Report No. 140106, January 4, 1937, copies of which are available to anyone on request.



The path of cooled air and Odac circulation

Better Health for Entire Family with Pleasantaire's Exclusive Odac Air Freshener

The Northwind Odac Air Freshener is an exclusive feature made available for the first time to air conditioning by Pleasantaire. This harmless, odorless chemical freshener deodorizes and purifies the air—dispels all odors—cooking cabbage, tobacco odors or frying fish.

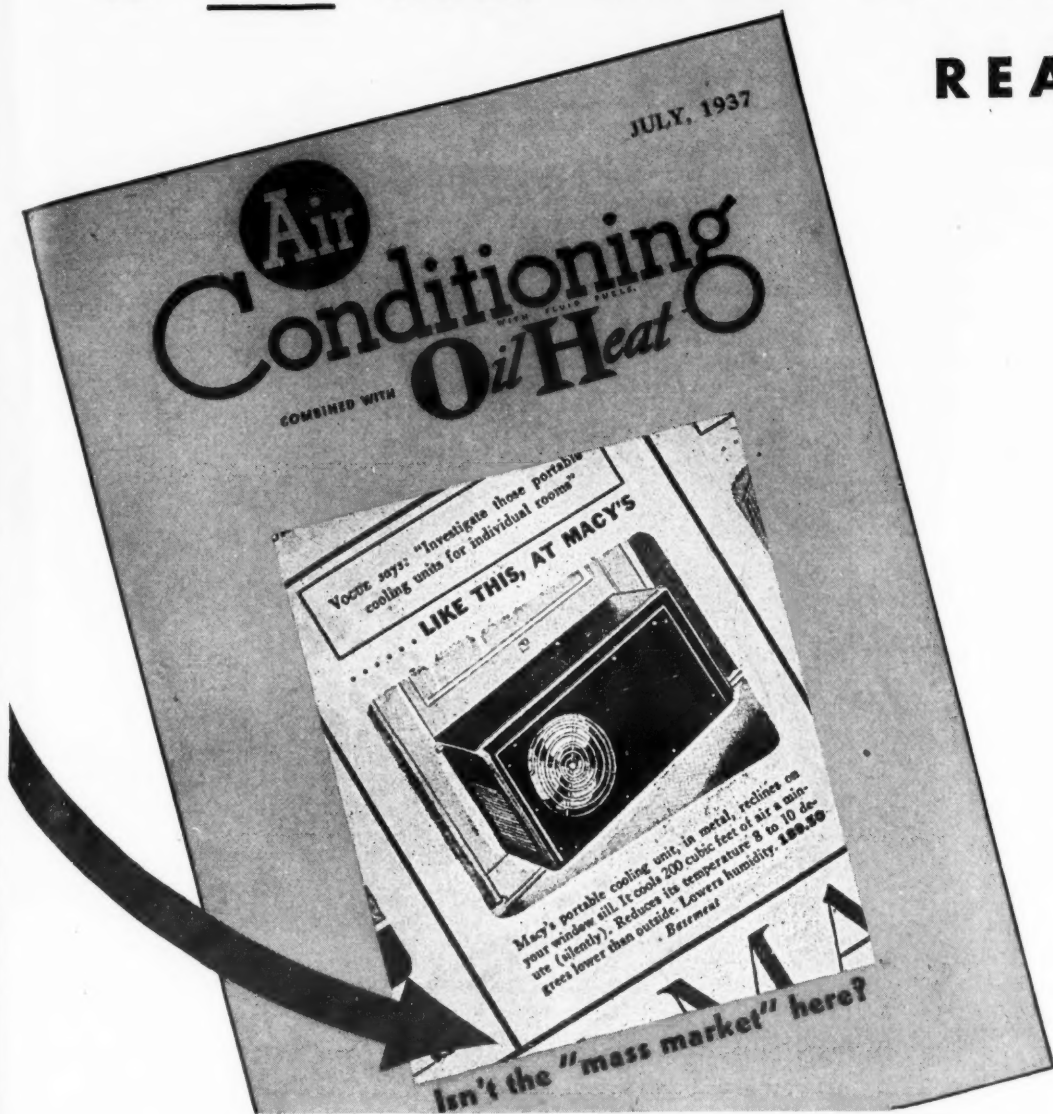
Northwind Odac is a concentrate of chemical properties, known and used by science for generations, that is destructive to the microorganisms which create odors. It has never been available before in the air conditioning field.

Odac scientifically changes bad, stale air to clean, fresh healthful air. Think what that means as an aid to the health of the children—of the entire family.

One bottle of Odac lasts for a period of six weeks. Replacements are easily made and refills are obtainable either from an authorized Pleasantaire dealer or direct from the factory. Pleasantaire offers pleasant relief from humid heat plus health-conditioned air.

this "mass market"?

IF YOU EVER EXPECT TO GET INTO AIR CONDITIONING
READ THIS SPECIAL OFFER



The above is Pleasantaire's unit!—the "Mass Market" is here! And this genuine summer air conditioner, SELLS AT ONLY

\$199⁵⁰

COMPLETELY INSTALLED

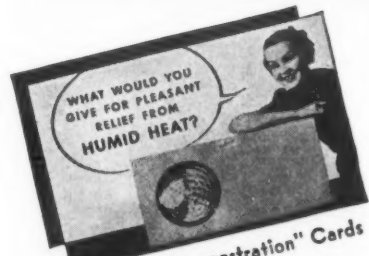
Pleasantaire now has dealers in 35 states — We want more, experienced dealers for next year. Remember — every refrigerator man is a Northwind Service Station — no worries for you.

**CLIP THE WIRE NOW
—HAND IT TO A MESSENGER
—SEND IT COLLECT**

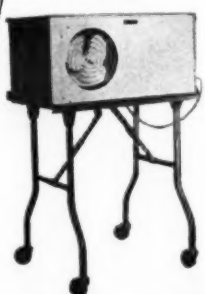
**A COMPLETE
MERCHANDISING
PLAN THAT SELLS!**



Consumer Folders



"Request for Demonstration" Cards



Rolling Demonstration Stand



The Pleasantaire Hand Book

All of these — Plus valuable advertising support—spell P-R-O-F-I-T-S

WESTERN UNION

NEWCOMB CARLTON
CHAIRMAN OF THE BOARD

R. B. WHITE
PRESIDENT

J. C. WILLEVER
FIRST VICE-PRESIDENT

Send the following message, subject to the terms on back hereof, which are hereby agreed to

**PLEASANTAIRE CORPORATION
304 EAST 45TH STREET, N. Y. C.**

RUSH ME AT ONCE EXPRESS COD ONE PLEASANTAIRE UNIT COMPLETE WITH
ROLLER STAND AND MERCHANDISING PLAN FOR ONLY ONE HUNDRED TWENTY
FIVE DOLLARS

(Signed)

Address

THE QUICKEST, SUREST AND SAFEST WAY TO SEND MONEY IS BY TELEGRAPH OR

Federal Trade Commission Finds Claims of Excessive Dehydration & Odor Transfer In Mechanical Units are Unfounded

Findings as to the Facts

PARAGRAPH ONE

Respondent, The Coolerator Co., is a corporation, organized in 1928 under the laws of the State of Minnesota as The Duluth Refrigerator Co. Its corporate name was subsequently changed to The Coolerator Co.

Its principal office and place of business is located at Fiftieth Ave., West, and Wadena in the City of Duluth, State of Minnesota. Since its incorporation, it has been, and now is, engaged in the business of distributing and selling to retail dealers for resale refrigerators using natural or artificial ice as the cooling element therein.

(Paragraphs 2, 3, and 4 have been omitted.)

PARAGRAPH FIVE

In such competition between the sellers of non-mechanical refrigerators and the sellers of mechanical or electric refrigerators, one of the controlling influences upon the purchasing public is the popular opinion as to the comparative desirability, effectiveness and safety in actual operation of the two types of refrigerators.

The use of ice in refrigerators has long been practiced and its desirability, effectiveness and safety as a method of refrigeration are well known and understood by the purchasing public. Because of its comparatively recent invention, the public is not generally so well informed as to the desirability, effectiveness and safety of mechanical or electric refrigerators as it is with respect to these qualities in non-mechanical refrigerators.

Nature of Claims Made In the Coolerator Booklet

PARAGRAPH SIX

In advertising the non-mechanical refrigerator which it sells, and for the purpose of promoting the sale of said refrigerators by retail dealers, The Coolerator Co. has made use of booklets, folders, circulars, and other advertising literature, some of which it distributes to members of the purchasing public located in the various states of the United States, and some of which it furnishes to its customers, to be by them placed in the hands of members of the purchasing public.

It has also made use of advertisements inserted in newspapers and magazines having a general circulation throughout the various states of the United States. It has also, in the past, made use of a certain booklet entitled "Why Ice is Best for Refrigeration". . . .

In said booklet entitled "Why Ice is Best for Refrigeration," the respondent, by direct statement and by implication, made the following representations:

(1) That a temperature of from 45 to 50° is the established or required standard temperatures necessary to be obtained in all types of refrigerators for the most satisfactory preservation of foods;

(2) That in mechanical or electric refrigerators the proper temperature for the preservation of foods cannot be maintained without detrimentally disturbing the natural composition of the air in the refrigerator and the natural composition of the food;

(3) That the various gases used in electric refrigerators as part of the refrigerant escape from the coils in which they are contained, per-

meate the food chamber and have a deleterious effect on and taint the foods contained in said refrigerator;

(4) That foods kept in electric refrigerators lose water, or dehydrate to such an extent that their nutritive properties are impaired, destroying essential parts of the chemical combination of various foods in their natural state;

(5) That foods kept in non-mechanical refrigerators do not dehydrate or lose water, to any extent whatever;

(6) That it is possible only with ice to produce the proper temperature control of foods without disturbing the natural composition of the air or food in the refrigerator, and that similar or comparable results cannot be obtained by use of electric refrigerators;

(7) That certain poisonous gases,

tion of food. Doctors and food experts are not now entirely in accord on the question of the temperatures required in order to most satisfactorily preserve food stored in refrigerators.

Such temperatures as will produce the desired preservation of food are not limited, however, to the range between 45 to 50° F. and food can properly be preserved at temperatures lower than 45° F.

The temperature necessary to preserve food depends, in part, upon the character of the food and the length of time it is to be preserved. Some foods will keep longer under a given temperature than other foods. It is generally understood and agreed by experts that a maintained temperature of 50° F. or lower will properly preserve perishable foods in an edible condition for the length of time that

Attention: Salesmen and Dealers!

Every salesman of household refrigerators should tear out this and the two following pages, and clip them into his presentation book. Here is an unbiased statement prepared by an official governmental agency—and printed in an independent news organ—of the efficiency, adequacy, and efficacy of mechanical refrigeration. These findings are based on hearings in which all branches of the refrigeration industry had opportunity to present testimony.

such as sulphur dioxide and chlorine are formed from the decay of foods stored in electric refrigerators in such quantities that said gases have a harmful effect in tainting foods and in reducing their nutritive value;

(8) That in non-mechanical refrigerators any poisonous gases formed from decay of foods are entirely absorbed by the water from the melting ice and are carried away through the drain pipes thereof, but that in electric refrigerators such poisonous gases are not absorbed, and said gases remain in the ice cubes made in said refrigerators;

(9) That the gelatinous matter found in drain pipes of non-mechanical refrigerators is formed from gases emanating from food contained therein being absorbed and carried away by the water from the melting ice, and that the ice cubes frozen in an electric refrigerator contain the same matter as is claimed to be contained in the drain pipe of a non-mechanical refrigerator;

(10) That the users of electric refrigerators will not be able to eat food therefrom, without tasting other food that was stored in the refrigerator at the same time.

Certain other advertising literature distributed by the respondent in commerce among and between the various states of the United States contains language which may serve as representations to the same effect as some of the representations hereinabove set out.

45 to 50° F. Not Standard; Less than 45° Not Harmful

PARAGRAPH SEVEN

A temperature of from 45 to 50° F. is not the established or required standard temperature necessary to be obtained in all types of refrigerators for the most satisfactory preservation of food and those temperatures have not been established as a standard in the industry or among doctors and food experts generally.

At this time, there appears to be no established or required standard temperature necessary to be maintained in all types of refrigerators for the most satisfactory preserva-

temperatures have been established as a standard in the industry and that a temperature of 45° is the minimum temperature at which foods may properly be preserved in a refrigerator contrary to the facts.

Why Dehydration Is No Greater in Electric Units

PARAGRAPH EIGHT

The natural composition of air is a mixture of nitrogen, oxygen, carbon dioxide, certain rare gases and water vapor. The water vapor or moisture content is the only factor involved in this proceeding.

Air containing the maximum amount of moisture it can hold at a given temperature is said to be saturated or at 100% relative humidity. Air containing less moisture than it is capable of holding is unsaturated. Its degree of saturation at a given temperature is expressed by the ratio of its actual moisture content to its maximum possible moisture content divided by 100 and is expressed as per cent relative humidity.

The quantity of water vapor or moisture content in the air is variable, depending upon the temperature of the air, the amount of available moisture and the temperature of the surrounding medium with which the air comes in contact.

Until air reaches the saturation point, it has a tendency to absorb moisture from any moisture-laden substance with which it comes in contact if the temperature of the substance is at the temperature of the air or at a higher temperature than the air. The higher the temperature of the air, the greater its capacity to hold moisture.

Further, at any temperature, liquid water, if it is at the same temperature or warmer than the surrounding air, can evaporate into the surrounding air mixture until such air becomes saturated. Such process of taking up moisture by air is generally known as dehydration since this is the effect on the substance from which the water is taken.

For the purpose of determining moisture loss the temperature of the air in a refrigerator is principally controlled by the temperature of the cooling medium, the temperature of the food and the temperature of any air coming into the refrigerator when opened. The cooling medium of a refrigerator, being colder than the air which passes it, chills the air and in so doing reduces its capacity to hold moisture.

The air leaving the cooling element is at or near saturation (100% relative humidity), but it carries less moisture than it did before contacting the cooling element because it is at a lower temperature. The surplus moisture is condensed on the surface of the cooling element (as water when ice is used or as water

or frost when a mechanically cooled coil is used.

As the air passes through the refrigerator, it warms up. In so doing it regains its capacity to carry moisture and its relative humidity decreases.

As this air passes over foods containing moisture, it picks up moisture in an amount which is dependent upon its relative humidity, the difference between the temperatures of the substances it contacts and the type and area of the type and area of the substances or food surfaces exposed. Wet surfaces and leafy foods such as lettuce or celery give up moisture readily while foods protected by rinds or heavy skins give up moisture slowly.

Air at any given temperature requires a greater quantity of water to raise it from any given degree of saturation (per cent relative humidity) to any other given degree of saturation than does air at any lower temperature and the same degree of saturation.

For example: at a temperature of

(Continued on Page 7, Column 1)

GO TO
Gilmer
FOR YOUR
V-BELTS

Why?... Here's why!

GILMER BELTS ARE NEVER SKIMPED

Full size. Full width. Full thickness. Don't turn over in the grooves.

GILMER BELTS STAND SERVICE

Brute-strong. Full-bodied. Tough. Minimum stretch. Run quietly, permanently, under pulsating compressor loads.

GILMER BELTS FIT

Made by belt engineers on the world's largest assortment of V-moulds. Easy to get the belt that fits special jobs—all jobs—exactly.

GILMER GIVES QUICK DELIVERIES

Speedy service everywhere, always. Full stocks on hand all the time. Gilmer jobbers fill your orders fast... no lost time, no lost customers.

GILMER DISPLAYS PAY

The Gilmer Bar (35 hooks on a 36-inch rack) and the Gilmer Hook take little space and keep belt stock in perfect order. Attractive. Easy to inventory. Your belts are out to be seen and sold. Ask about FREE offer.

GET GILMER "V's"

Only Gilmers give you those 5 Famous Features

L. H. GILMER CO.

Tacony, Philadelphia

THE OLDEST FIRM OF RUBBER FABRIC BELT SPECIALISTS

Send for FREE Catalog

POPULAR MECHANICS



The ANSUL Twins

ANSUL CHEMICAL COMPANY

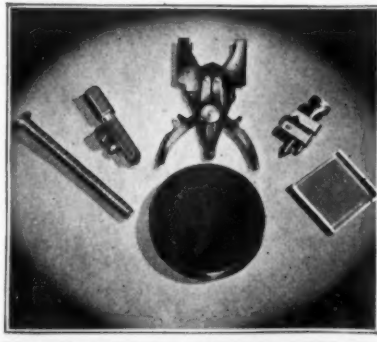
MARINETTE

WISCONSIN

PERFECTION Service Tools are Certified to Excel

Ask for catalog covering complete line of Service Tools, Condensing Water Regulators, Compressor Parts, Valves and Fittings.

PERFECTION REFRIGERATION PARTS CO. HARVEY, ILLINOIS



Federal Trade Arbiters' Study Dissolves Claims of Greater Drying in Mechanical Units

(Continued from Page 6, Column 5)

40° F. and 40% relative humidity, air can hold approximately .002 lb. of water per lb. of dry air. At saturation point air at the same temperature can hold approximately .00525 lb. of water per lb. of dry air. In raising the relative humidity from 40% to saturation, .00325 lb. of water per lb. of dry air must be added.

At a temperature of 50° F. and 40% relative humidity, air can hold approximately .0031 lb. of water per lb. of dry air. At saturation air of the same temperature can hold approximately .00765 lb. of water per lb. of dry air. In raising the relative humidity from 40% to saturation, .00455 lb. of water per lb. of dry air must be added.

By increasing the initial relative humidity of the 50° F. air to 50%, we find that the air can hold .0038 lb. of water per lb. of dry air. In raising the relative humidity from 50% to saturation, .00385 lb. of water per lb. of dry air must be added. Thus, air at 50° F. and 50% relative humidity requires more water to raise it to saturation than does air at 40° F. and 40% relative humidity.

The amount of water foods in a refrigerator can lose depends also upon how fast the water is evaporating from the foods (rate of evaporation) and the length of time the foods are kept in the refrigerator. The rate of evaporation from a substance depends principally upon the difference between the vapor pressure of the water in the substance and the vapor pressure of the moisture in the air.

The vapor pressure of the water in the substance is generally the same as the temperature of the substance. The vapor pressure of the air is its saturation moisture content (dewpoint temperature). When foods are placed in a refrigerator for a sufficient time to cool down to the temperature of the air, the vapor pressure of the water in the substance and the vapor pressure of the moisture in the air become substantially equal.

Because of the operation of the foregoing principles, the amount of moisture that can be taken up to bring air from any degree of saturation to its saturation point depends on the temperature of the air, its relative humidity and the rate of evaporation.

In view of the foregoing, under certain conditions, there will be no greater dehydration in a mechanical refrigerator than in a non-mechanical refrigerator even though the relative humidity of the air therein is lower, because the differences in the vapor pressures of the substances and the vapor pressures of the air in the two types of refrigerators will be substantially equal.

Dehydration of food takes place in both mechanical or electric refrigerators and non-mechanical or ice refrigerators to a varying amount, depending upon the various factors herein set out. Excessive dehydration of food affects its appearance and its texture, and makes it less appetizing, even though it does not affect its nutritive properties.

In an effort to overcome the factor of dehydration, manufacturers of mechanical or electric refrigerators have provided covered containers which are placed in the food chamber. These containers are not, however, standard equipment in all makes or types of mechanical or electric refrigerators. Foods that are readily susceptible to dehydration, like leaf vegetables, are placed in these covered containers, when provided, so that the air as it circulates in the food chamber does not come in direct contact with that food.

By the use of these covered containers the dehydration of foods stored therein has been practically eliminated, and the dehydration that takes place in food stored in covered containers is substantially less than it would be if the same foods were stored in the open food compartments of a mechanical or electric refrigerator, or a non-mechanical or ice refrigerator. Such containers may also readily be used in non-mechanical or ice refrigerators with comparable results.

Proper Temperatures Don't Disturb Food Composition

The representations of the respondent set out in subsections (2), (4), (5), and (6) of Paragraph Six are too general, are lacking in specific limitation, are misleading and, in some instances, are not true. Proper temperatures for the satisfactory preservation of foods usually kept in mechanical refrigerators for domestic use can generally be maintained without detrimentally disturbing the natural composition of the food.

Foods stored in mechanical refrigerators for the length of time that foods are ordinarily and customarily stored in refrigerators when intended for domestic use do not dehydrate

or lose water to such an extent as to impair their nutritive properties or to destroy the essential parts of the chemical combinations thereof.

Foods kept in non-mechanical refrigerators do dehydrate or lose water to some extent, depending upon the factors herein set out. Refrigeration by use of ice as a refrigerant or by use of other refrigerants does disturb the natural composition of the air in a refrigerator. The extent of this disturbance depends upon the variable factors above referred to, but in refrigerators of both types, the extent of this disturbance is not generally sufficient to affect the natural composition of the food stored in the refrigerator to such an extent as to make it undesirable for human consumption.

It is possible by use of refrigerants other than ice, as well as by use of ice, to produce the proper temperature control of foods without disturbing the natural composition of the air or the food in the refrigerator to any harmful extent.

The refrigerants most commonly used in mechanical or electric refrigerators are: sulphur dioxide (SO_2), dichlorodifluoromethane (CCl_2F_2)

commonly known as Freon-12, and dichloromethane (CH_2Cl_2), commonly known as Carrene. The refrigerant most commonly used is sulphur dioxide which is a corrosive and suffocating gas. However, in recent years, certain of the manufacturers of mechanical or electric refrigerators have used and are now using Freon, or other derivatives, and Carrene, none of which are corrosive or suffocating gases, as refrigerants.

These refrigerants, when placed in the refrigerating unit of a mechanical or electric refrigerator, are under pressure as they pass through the cooling unit on the inside of the food chamber and if there is any defect in the tubing or in the connection from carelessness or misuse, these refrigerants may be forced out into the food chamber.

There have been instances in which mechanical or electric refrigerating units have developed defects either as a result of construction or of improper use and in which the refrigerant has escaped into the food chamber and tainted the food contained therein. Such cases, however, are very infrequent considering the number of units in use.

The various gases used as refrigerants in mechanical or electric refrigerators do not generally escape from the coils into the food chamber and taint the foods contained therein.

The representation stating or implying that the various gases used as refrigerants in mechanical or electric refrigerators escape from the coils into the food chamber and taint the foods contained therein is too general and is deficient in specific limitation as to the conditions under which the refrigerant may escape.

Gases Don't Form & Injure Other Foodstuffs

PARAGRAPH NINE

There is generally no substantial decay or decomposition of foods that are stored in refrigerators holding a maintained temperature of 50° F. or lower when such storage is for the relatively short period of time usually encountered in the use of refrigerators for domestic use.

At maintained temperatures below 50° F., bacterial growth and activity

(Concluded on Page 8, Column 1)

7,000 TONS of "FREON"* AIR CONDITIONING IN GOVERNMENT BUILDINGS IN WASHINGTON, D. C.

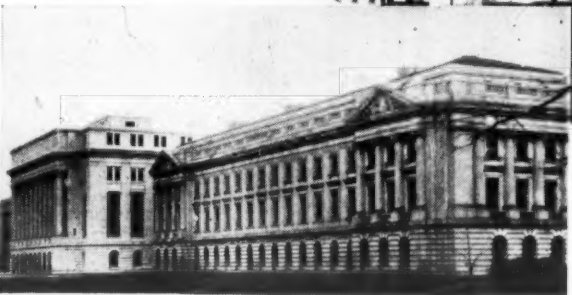


Library of Congress Addition—Jacobsen Bros., Chicago, Contractor; Pearson & Wilson, Architects and Consulting Engineers. "Freon" refrigeration for air conditioning by York Ice Machinery Corporation.

(Below) Senate Office Building—G. A. Fuller Co., Contractor; Geo. A. Weschler, Consulting Engineer. "Freon" refrigeration for air conditioning by York Ice Machinery Corporation.



Department of Justice Building—G. A. Fuller Co., Contractor; I. H. Francis, Consulting Engineer. "Freon" refrigeration for air conditioning equipment by York Ice Machinery Corporation.



Department of Agriculture (Administration Bldg.)—Riggs Distler, Contractor. Designed by National Park Service of the Dept. of Interior. Charles Leopold, Consulting Engineer. "Freon" air conditioning by the Frick Company.

Post Office Building—McCloskey & Co., Gen. Contractor; Mehling & Hansen, Sub-Contractors; Syska & Hennessey, Consulting Engineers. "Freon" refrigeration for air conditioning by York Ice Machinery Corporation.



(Left) Department of Interior Building (Old)—National Park Service, Consulting Engineer. Contractor and manufacturer of "Freon" air conditioning equipment—York Ice Machinery Corporation.



(Right) Archives Building—G. A. Fuller Co., Contractor; Clyde R. Place, Consulting Engineer. "Freon" air conditioning equipment by York Ice Machinery Corporation.

(and 4,800 additional tons for the Capitol Hill Buildings under construction)

"FREON" refrigerants are being used for most of the new government buildings in Washington.

"Freon" refrigerants are non-poisonous, non-flammable, non-explosive. They are odorless when mixed with air up to 20% by volume. They have no harmful effects on fruits, foods, flowers or clothing. They have been tested by the U. S. Bureau of Mines, and meet all specifications set by



FREON

REG. U. S. PAT. OFF.

safe refrigerants

*"Freon" is Kinetic's registered trade mark for its fluorine refrigerants.

the Underwriters' Laboratories of Chicago in their report, "Standard for Commercial Refrigerating Systems" (Subject No. 207). "Freon" refrigerants are used in practically all mechanically cooled railroad trains, and in schools, hotels, mines, restaurants, stores and homes in all parts of the world.

Make sure "Freon" refrigerants are included in your specifications for air conditioning.

KINETIC CHEMICALS, INC., TENTH AND MARKET STREETS, WILMINGTON, DELAWARE

Contention that Water in Cube Trays Picks Up Odors Called Misleading By Federal Trade Commission

(Concluded from Page 7, Column 5)
are generally inhibited and the lower the temperature, the greater the capacity to inhibit such activity.

Bacterial growth or activity is the primary cause of the decay or decomposition of food and various gases are formed by such decay and decomposition. The type of refrigeration used has no bearing on the formation of such gases.

The extent to which these gases may be formed depends on the length of time the food has been separated from its source, upon the temperature at which it has been preserved, and upon the relative humidity of the air. Some of these gases are poisonous. The nature of the gases thus formed depends on the type of food and the type of bacteria involved. Such gases as may be formed from the decay or decomposition of food do not include sulphur dioxide or chlorine though some, though not all of them, may be partially soluble in water.

When food decays or decomposes, the gases thus formed may be given off into the air and be absorbed to a certain extent by other foods. In a non-mechanical refrigerator, a certain portion of those gases which may be soluble in water may be absorbed by the water from the melting ice as the air passes it, and then carried down the drain pipe.

In mechanical refrigerators, except as herein later discussed, a certain portion of those gases which may be soluble in water may be absorbed by the water in the ice cube trays and the frost on the cooling unit.

It does not appear to have been scientifically established to what extent such gases as may be formed from food decay are soluble in water, if at all, and to what extent they may be absorbed by the water and carried away in the drain pipe of a non-mechanical refrigerator, or to what extent they may be absorbed by the water in the ice cube trays or the frost on the cooling unit of a mechanical refrigerator.

The representations by the respondent set out in subsections (7) and (8) of Paragraph Six hereof are deficient in specific limitation, indefinite, exaggerated, and untrue in the particulars above set out.

Such gases as may be formed from the decay or decomposition of foods are not formed to any substantial or noticeable extent when temperatures are maintained at a point sufficient to inhibit bacterial growth and activity and under such circumstances do not have any harmful effect in tainting foods or in reducing their nutritive value.

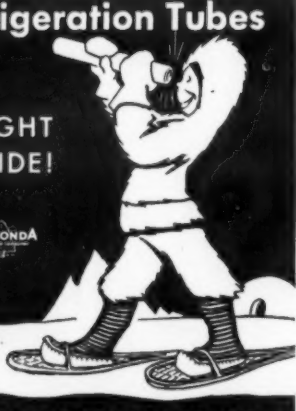
No Absorption of Odors in Ice Cubes, Says Report

PARAGRAPH TEN

The gelatinous mass sometimes found in the drain pipe of non-mechanical refrigerators is made up of gases and odors emanating from food and from the growth of bacteria, algae, and molds in the drain pipe itself. It has not been scientifically determined to what extent the contents of the drain pipe of a non-mechanical refrigerator are made up from gases, odors, and bacteria emanating from the food or to what extent the contents are made up of growth of bacteria, algae, and molds taking place in the drain pipe itself.

Anaconda Copper Refrigeration Tubes

BRIGHT INSIDE!



THE AMERICAN BRASS CO.
FRENCH SMALL TUBE BRANCH
General Offices: Waterbury, Conn.

The gelatinous matter found in a drain pipe of a non-mechanical refrigerator will not be found in ice cubes frozen in a mechanical refrigerator. The growth of bacteria, algae, and molds which may take place in the drain pipe of a non-mechanical refrigerator cannot take place in the cube trays or on a cooling unit of a mechanical refrigerator under normal operating conditions.

The representations to the effect that the gelatinous matter found in the drain pipes of non-mechanical refrigerators may be found in ice cubes frozen in a mechanical refrigerator are untrue and are deficient in specific limitation.

Many mechanical refrigerators are equipped with covers over the cube trays or with doors to the cube tray compartment of the cooling units as standard equipment. Some mechanical refrigerators do not have such equipment.

In those types of mechanical refrigerators which do have such equipment there is, for all practical purposes, no flow of air from the food chamber through the cube compartment of the cooling unit that can come in direct contact with the water in the cube trays.

For that reason, there is, for all practical purposes, no absorption by the water in the cube trays of gases that may be formed from the decay or decomposition of foods in the food chamber or of any food odors.

Transfer of Food Odors Not Determinable

PARAGRAPH ELEVEN

There are certain foods that have characteristic and inherent odors which are constantly being thrown off into the air, irrespective of any process of decomposition or decay. There are certain other foods which upon coming in contact with air will absorb odors already contained therein. If these two types of foods are placed in a refrigerator at the same time, the foods which have a tendency to absorb odors will absorb such odors of the other food to such an extent that a person eating such foods may taste the odor of the other foods.

This transferring of odors from one food to another will take place in refrigerators of any type to a certain extent. It has not been scientifically determined to what extent this takes place in a non-mechanical refrigerator or in a mechanical refrigerator.

Users of mechanical or electric refrigerators will be able to eat the food stored therein without tasting other foods that were stored in the refrigerator at the same time except as to the type of food in which such transference of odors does actually take place.

Many foods, however, do not absorb odors from other foods and as to those foods, users of electric or mechanical refrigerators may eat said foods without tasting other foods that were stored in the refrigerator at the same time.

Says Claims were Confusing And Misleading Public

PARAGRAPH TWELVE

The aforesaid acts and practices of the respondent in making the representations hereinabove detailed, in selling and promoting the sale of its non-mechanical refrigerators, have had, and now have, a tendency and capacity to confuse and mislead the public with respect to the true facts as to the relative merits and operating factors of the erroneous and mistaken beliefs that mechanical refrigerators are undesirable and ineffective in use and are harmful and dangerous to the users thereof, and into the purchase of respondent's non-mechanical refrigerators on account of said beliefs induced as aforesaid.

As a result thereof there has been, and is, a capacity and tendency to unfairly divert trade to the injury of competitors who do not make use of similar statements, to the injury of competition in commerce among and between the various states of the United States.

CONCLUSION

The aforesaid acts and practices of the respondent, The Coolerator Co., are to the prejudice of the public and of respondent's competitors, and constitute unfair methods of competition in commerce, within the intent and meaning of Section 5 of an Act of Congress, approved Sept. 26, 1914, entitled "An Act to create a Federal Trade Commission, to define its powers and duties, and for other purposes."

By the Commission.

W. A. AYRES, Chairman.

Text of FTC 'Cease and Desist' Order In the Coolerator Case

DOCKET NO. 2770 ORDER TO CEASE AND DESIST

This proceeding having been heard by the Federal Trade Commission upon the complaint of the commission, the answer of respondent, testimony and other evidence taken before John J. Keenan, an examiner of the commission heretofore duly designated by it, in support of the allegations of said complaint and in opposition thereto, and a stipulation as to the facts executed by W. T. Kelley, chief counsel of said commission and the respondent, and the commission having made its findings as to the facts and its conclusion that said respondent has violated the provisions of an Act of Congress approved Sept. 26, 1914, entitled "An Act to create a Federal Trade Commission, to define its powers and duties, and for other purposes";

IT IS ORDERED that the respondent, The Coolerator Co., a corporation, its officers, servants, employees, agents and representatives, in the course of the sale and distribution in interstate commerce of non-mechanical, or ice refrigerators, cease and desist from representing:

1. that a temperature of 45 to 50° F. is the established or required standard temperature necessary to be obtained in any or all types of refrigerators for the most satisfactory preservation of food; provided that the respondent is not hereby prohibited from representing that a maintained temperature of 50° F., or lower, in a domestic refrigerator is a generally satisfactory temperature for the preservation of perishable foods usually kept in refrigerators for domestic use;

2. that in mechanical refrigerators a proper temperature for the preservation of foods cannot be maintained without detrimentally disturbing the natural composition of the air in the refrigerator or the natural composition of the food; provided that the respondent is not hereby prohibited from representing that the natural composition of air in both non-mechanical and mechanical refrigerators, except the air in hydrators or covered containers, is changed to the extent that its moisture content is diminished in the process of refrigeration and that the natural

composition of certain foods stored in all refrigerators is affected to the extent to which moisture is absorbed by the air coming in contact with said foods;

3. that the various gases used in mechanical refrigerators as part of the refrigerant escape from the coils in which they are contained, permeate the food chamber and have a deleterious effect on and taint the food therein; provided that the respondent is not hereby prohibited from representing that sulphur dioxide is one of the gases commonly used as refrigerant in stated or specified mechanical refrigerators; that it is a poisonous gas and that if it should escape from the coil in the refrigerating unit, it might permeate the food chamber and have a deleterious effect on and taint the foods contained therein;

4. (a) that foods kept in mechanical refrigerators lose water or dehydrate to such an extent that their nutritive properties are impaired and essential parts of the chemical combinations of various foods in their natural state destroyed; and

(b) that foods kept in a non-mechanical refrigerator do not dehydrate or lose water to any extent whatever; provided that the respondent is not hereby prohibited from representing to what extent, under stated conditions, certain specified foods kept in a non-mechanical refrigerator dehydrate or lose water and to what extent, under the same conditions, the same specified foods kept under comparable conditions in a mechanical refrigerator dehydrate or lose water;

5. that sulphur dioxide or chlorine is formed from the decay of foods contained in mechanical refrigerators;

6. that poisonous or other gases

are formed from the decay of foods stored in mechanical refrigerators in such quantities that they have a harmful effect in tainting said foods and in reducing their nutritive value;

7. (a) that in a non-mechanical refrigerator, such poisonous or other gases as may be formed from the decay of foods are entirely absorbed by water from the melting ice and are carried away through the drain pipe thereof, but that in mechanical refrigerators such poisonous or other gases as may be formed from the decay of foods remain in the ice cubes made in said refrigerators and are not absorbed and carried away; and

(b) that the gelatinous matter found in the drain pipe of a non-mechanical refrigerator is formed solely and entirely or principally from gases emanating from foods contained therein being absorbed and carried away by the water from the melting ice and that the ice cubes frozen in a mechanical refrigerator contain the same matter contained in the gelatinous matter found in the drain pipe of a non-mechanical refrigerator;

8. that the users of mechanical refrigerators will not be able to eat the food therefrom without tasting such other food that was stored in the refrigerator at the same time; provided that the respondent is not hereby prohibited from representing what foods, under stated conditions, give off odors and what foods will absorb such odors and to what extent such transferring of odors from one food to another will take place.

IT IS FURTHER ORDERED that the respondent shall, within ninety (90) days after service upon it of this order, file with the Commission a report in writing setting forth in detail the manner and form in which it has complied with this order.

Utah Fair Trade Act Given First Trial

SALT LAKE CITY—With the signing of a contract between the Maytag Northwest Co., of Portland, Ore., and the Quality Appliance Co., of this city, last week, the new fair trade act recently passed by the Utah legislature was given its first practical application.

J. A. Anderson, regional manager of the Maytag Northwest Co., and H. P. Anderson of the dealership, signed the contract.

A number of similar contracts between manufacturer and dealer are expected to be completed soon, it is reported.

McLain Retail Electrolux In Natchez, N. M.

NATCHEZ, Miss.—McLain Refrigerator Co., recently opened here, is handling Electrolux refrigerators, specializing in the kerosene type for rural use.

CONCENTRATED FLAME

with the
PREST-O-LITE TORCH
Trade-Mark
you can avoid damage
to adjacent fixtures...



Prest-O-Lite Torches are adaptable for all soldering, heating and light brazing where accurate control of the flame is necessary for good workmanship. The concentrated flame can be applied to a small area on one side of the fitting—opposite from the solder—and without damage to adjacent fixtures.

Your Prest-O-Lite jobber will gladly demonstrate how a Prest-O-Lite Torch will enable you to do jobs more profitably and quickly.

THE LINDE AIR PRODUCTS COMPANY
Unit of Union Carbide and Carbon Corporation
UCC

New York and Principal Cities
In Canada:
Dominion Oxygen Co., Ltd., Toronto

PREST-O-LITE GAS is readily obtainable through thousands of Prest-O-Lite Exchange Service Stations.

This Simple patent is the secret that has made

a SILENT V-BELT

... and here's the reason

When a straight-sided V-belt bends around its pulley there is tension on the top of the belt and compression on the bottom. This makes the side walls bulge outward—as shown in figure 1, below.

The Gates Belt is built with a patented concave side. The bulge, due to bending, simply straightens the concave side to a precise fit with the sheave groove as shown in figure 2.

This exact fit naturally prevents slipping. No slipping means a SILENT belt, a belt that wears longer, a belt that does not heat and therefore does not stretch.

BELT GUIDE — FREE

The Gates Belt Guide is the recognized national authority on correct belt fit for ALL Refrigerators, Washing Machines, Pumps, Stokers, etc., etc. FREE from your jobber or the GATES RUBBER CO., Denver, Colorado.

Write Today!

GATES BELTS



AIR CONDITIONING NEWS

Nelson Designs New Self-Contained Room Cooler

MOLINE, Ill.—A new self-contained room cooling unit, designed for residential and office use, has been introduced by Herman Nelson Corp., manufacturer of unit heaters and air-conditioning equipment.

This room cooler, it is claimed, can be located anywhere in a room (not necessarily near a window), and installed simply by making electric and water connections. Quiet operation and dehumidification are provided.

Made in a single size of 3/4-ton cooling capacity, the unit has a sensible heat rating of 6,400 and a total rating of 9,000 B.t.u. per hour. Rate of air circulation is 360 c.f.m.

Consisting of a reciprocating Freon compressor, water-cooled condenser, evaporator, fan, motor, and cabinet, the cooler draws air through an evaporator in the rear, cooling and dehumidifying it.

Outgoing air is blown by a propeller-type fan through a grille in the front, the air current being directed downward and across the floor to produce maximum cooling per unit of electricity used.

On the side of the cabinet are two pearl-white control knobs, one of which operates the fan, the other the automatic thermostat. The fan can be used without the compressor, and the thermostat can be set for the degree of cooling desired.

Of modern design, the cabinet is 31 1/2 inches high, 30 1/2 inches wide, and 15 1/2 inches deep. It is constructed of heavy gauge furniture steel, and finished in iridescent, light-tan baked enamel with stainless steel trim.

7-Ton System Cools Hotel Dining Rooms

CLARKSBURG, W. Va.—A 7-ton air-conditioning system was recently installed by the management of the Gore hotel here to cool its grill room, new Marine dining room, and two smaller rooms used for private parties.

The system provides complete air conditioning, including cooling, filtering, dehumidification, ventilation and circulation of air. Equipment is fitted with automatic controls by which the cooled air can be switched to the grill, dining room, or private rooms during hours when patronage in any of the rooms is heaviest. The system, however, can provide cooled air to all of the rooms at the same time if desired.

Equipment was installed by the Monongahela West Penn Public Service Co. The Gore hotel is the second large Clarksburg establishment to install air conditioning this summer, the previous installation being made in the Ritz theater.

York Dealer Moves into Air-Conditioned Store

GREENSVILLE — Following the lead of many of his associates who believe in "practicing what they preach," J. A. Bowen, York air-conditioning equipment dealer, has moved into completely air-conditioned quarters.

Atlanta Duct Contractor Moves to New Quarters

ATLANTA — Dependon Roofing Supply Co., which handles pipe and ductwork for York and Sturtevant air-conditioning installations, has moved to new quarters at 364 Jones Ave. R. H. Hogg, Jr., is president.

General Electric Ventilation In Manchester, N. H. Theater

MANCHESTER, N. H.—A General Electric ventilation system has been installed in the recently opened Crown Theater by Rodolphe L. Dunham, who also installed the building's plumbing and heating equipment.

40 Airtemp Field Men Attend 2-Day School At Saginaw, Mich.

SAGINAW, Mich.—More than 40 Airtemp air-conditioning dealers and sales engineers attended a two-day school at the offices of Morgan-Johnson, Inc., Airtemp distributor, July 7 and 8 for the purpose of explaining Airtemp's new self-contained unit.

George Morgan and Buhl S. Johnson were the company hosts. Factory representatives included H. B. Orr, general manager of the Detroit branch; J. E. Wilson, field representative; A. F. Frazee, zone manager; V. P. Black, service and erection manager, and D. H. Lewis, field engineer.

Unit to Cool Promotion Meeting Helps Sell 24 Mobilaires to Hotel

NASHVILLE, Tenn.—Interest in air-conditioning engendered when a Westinghouse Mobilair unit was brought in to cool the room in which an air-conditioning meeting was held in the Noel hotel here recently, led the hotel management to purchase 24 Mobilair units from the H. Cohen Appliance Co., distributor here.

At the conclusion of the air-conditioning meeting, the management requested permission to place the unit in one of its largest suites for a trial period, and later signed the 24-unit order.

The new service has proved so popular with hotel guests that the management is contemplating the purchase of 26 additional units, according to Stephen H. Harrington, manager of the distributorship.

Considering the summer season to be 100 days long, the hotel management's plan to make the investment pay for itself is to charge off one

dollar per day for the next four years. Patrons will be charged an extra dollar each day for the service.

According to Mr. Harrington, approximately \$100,000 worth of business was booked by the firm during the refrigeration and air-conditioning show held here recently. The orders included a contract to install air conditioning in the local Paramount theater. Two Mobilair units were sold to the Third National Bank.

6-Month Trane Co. Earnings Nearly Double 1936 Period

LA CROSSE, Wis.—Trane Co., manufacturer of air-conditioning equipment, reports net income for the six months ended June 30 of \$227,000, before deduction of federal taxes, compared to \$122,000 for the same period last year.

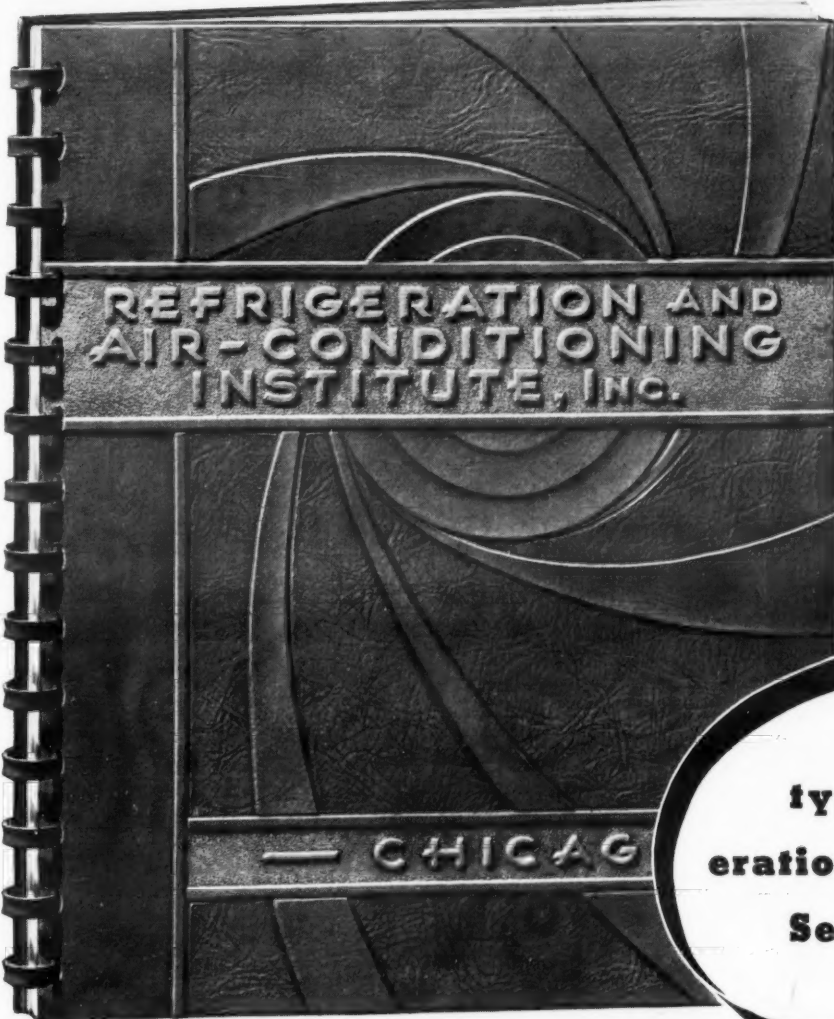
Sales for the first half of the year totaled \$1,982,000, compared to \$1,122,000 for the first half of 1936. Earnings for the six-month period this year were equal to 87 cents a share on common stock, against 41 cents for the same period last year.

Hoppe Now in Enlarged Dallas Quarters After Fire

DALLAS — Remodeled and enlarged, and with offices and one display room air conditioned, the quarters of Joe Hoppe, Inc., refrigeration and air-conditioning firm, were reopened recently following a fire which did between \$2,000 and \$3,000 damage.

Acquiring shop room next to that already occupied, the firm installed additional display rooms for air-conditioning units. In one of these, a self-contained unit and another unit, connected with the remote system which cools the firm's rooms, are shown. A similar display room (not air conditioned) to house second-hand refrigerators and commercial equipment is being built.

Total space conditioned includes 12 1/2 x 30 feet of office floor space, and 12 1/2 x 40 feet of display room space. The system uses an evaporative condenser stationed in the back of the building, and a 3-hp. motor.



The Refrigeration and Air Conditioning Institute has published an "Official Report to the Industry" describing its work in training men. We believe this book will be of great benefit to every employer in the fields of refrigeration, air conditioning and heating and ventilating because it points the way to a complete solution of all personnel problems in installation and service work of all kinds.

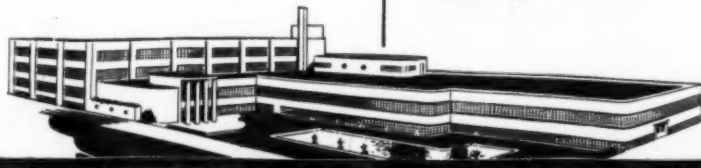
The Report is cloth bound . . . contains more than 200 pages descriptive of the Institute's training program; an outline of the training subjects; copies of original letters from leading manufacturers telling what they think of the training . . . and 15 original photographs showing students getting final training in the Institute's Shops and Laboratories.

Distribution of the Report is necessarily limited to manufacturers, engineers, distributors, dealers and contractors. Please request copies on your firm letterhead and give names and titles of individuals to whom books are to be sent.

There will be no cost . . . no obligation of any kind. The Institute has nothing to offer for sale to you. It merely wants to acquaint employers with the service it is rendering to them and to the Industry as a whole, and takes this means of reaching executives and heads of businesses who should be interested in this service.

NEW BUILDING NEW EQUIPMENT

Below is a sketch of the Institute's new \$250,000.00 Laboratory and Shops building, adjoining the present administration building, as it will appear by the end of 1937. This new building and new equipment will increase the Institute's training facilities by five times.



If you employ men for any type of Air Conditioning, Refrigeration, Heating and Ventilating Work . . .

Send for Your Copy Now!

NO COST . . . NO OBLIGATION

The problem of where to get the right man for the job need no longer be a problem for those engaged in the business of air conditioning, heating, ventilating and the sale and service of refrigeration equipment. There is now available a constant supply of competent and dependable trained men . . . men who have been trained exactly as the Industry wants them trained . . . to carry on the work of installation, maintenance, service and service engineering. This is made possible through the cooperation of many of the field's leading concerns in the development of an entirely new and practical training program, now in its third year. This new "high" in industrial training combines more than 1,000 hours of intensive home study, and 200 hours of actual shop work in the Institute's laboratories and shops in Chicago.

More than fifty outstanding manufacturers officially endorse the training program of the Refrigeration and Air Conditioning Institute. And among them, six large concerns have appointed their own engineers as a Board of

Governors to supervise it. This Board, whose members come to Chicago for regular conferences, has complete supervision of both the preparation and conduct of the training. Such supervision is assurance that every man trained under this program is trained to meet the exact needs of the industry's employers. We believe it is the only arrangement ever made through which an industry is able to supervise the operation of a nationwide training program, for the good of the entire industry.

There is no "gate crashing" in this training program. Only qualified men are accepted for training and these are carefully selected on the basis of education, experience, mechanical aptitude and character. We have a complete record, in minute detail, of every man we train, including the above factors, our rating of the man, his photograph, what his references say about him . . . in fact, everything which you, as an employer, would like to know. This information is available without obligation, on any man we recommend to you.

We invite you to write to us when in need of trained personnel of any kind.

Ray K. Smith
PRESIDENT

"Officially" Endorsed by More than 50 Leading Manufacturers Supervised by Manufacturer-Appointed Board of Governors

REFRIGERATION and AIR CONDITIONING INSTITUTE • 2130-2158 Lawrence Ave., CHICAGO

COMMERCIAL NEWS

Ontario Will Help Finance Cheese Refrigeration

TORONTO, Ont., Canada—Small cheese factories faced with the necessity of providing refrigerated storage facilities in compliance with a recent department of agriculture regulation will be aided by the Ontario government through loans at a low rate of interest and through guarantee of loans negotiated with banking institutions, according to Premier Mitchell F. Hepburn.

The new regulations, which became effective June 1, makes it compulsory for freshly made cheese to be held in storage at the factory at least eight days before shipping, to maintain the quality of the product. Enforcement of the regulation has been delayed to give factories time to comply.

Small factories protested the regulation, declaring that to prevent loss in weight and deterioration, cooling systems would have to be installed at a cost of about \$2,500 for each factory. It was this protest which brought announcement of the provincial government's offer of financial aid.

The new law means more than installation of refrigeration equipment for many Ontario cheese companies, according to Andrew Gray, manager of Avonback Cheese & Butter Co., Stratford, one of the largest cheese producing companies in that region, for he declares that in many cases it means the erection of plant additions for storage purposes.

Mr. Gray estimated that not more than 15% of the cheese factories in the province have mechanical refrigeration equipment at the present time.

Heating & Conditioning Firm Opens in Cleveland

CLEVELAND—J. F. Johnson, for 15 years with the Holland Furnace Co., has established the Johnson Cleveland Heating Corp. here at 10220 St. Clair Ave. A complete line of air-conditioning equipment is being handled by the firm, which is a Lenox Furnace distributor.

Good Market Found In Modernizing of Florist Equipment

FORT WORTH, Tex.—Installations of air-conditioning equipment in floral shops to replace more static refrigeration systems comprise one of his best sales markets at the present, says Pat Crow, refrigeration and air-conditioning dealer here.

Such installations, Mr. Crow reports, provide special features which make the set-up more satisfactory for the florist than did older refrigeration methods, particularly with regard to humidity control.

"In a florist's installation you must have a temperature below that maintained in the average air-conditioning installation; the temperature must drop to 60° at times," the dealer stated.

Zamoiski Establishes Commercial Dept.

BALTIMORE—Joseph M. Zamoiski Co., distributor of Norge and Philco products in this area, has established a new department which will distribute commercial refrigeration and air conditioning sales engineering promotion to its 200 dealers in Maryland, Virginia, West Virginia, and the District of Columbia.

Harvey W. Hottel, formerly sales and service supervisor of commercial refrigeration and air conditioning for Berks Engineering Co., Inc., Reading, Pa., has been appointed manager of the new department. Mr. Hottel also has had experience with Frigidaire, Kelvinator, Copeland, Carrier, and Lipman.

Tullis Reports Heavier Sales of Large Units

TOLEDO, Ohio—Tullis & Sizemore Electric Appliance Co., distributor for Kelvinator beverage coolers in northwestern Ohio, is selling five of the large BC-2507 models to one of the small BC-1507 coolers, reports President E. A. Tullis. Mr. Tullis formerly was vice president of the Leonard distributorship here.

Kelvinator Begins Shipments of New Commercial Line

DETROIT—Eight models in 15 different sizes, designed to suit every need of store, shop, hotel, or club, are included in Kelvinator's new line of reach-in refrigerators and display cases for commercial applications, first shipments of which have just been started.

Kelvinator's commercial case line, first complete one to be sponsored by a refrigeration manufacturer, features in all models "Kelvaseal no-fog" glazing, which carries a three-year guarantee against fogging or sweating, and a new high-bake Dulux finish.

Refrigeration is furnished by Kelvinator's condensing and cooling units, and all reach-in models and one display case model are self-contained.

The five display case models include a full-vision refrigerator case, a double-duty two-shelf refrigerator case, a double-duty refrigerator case, a single deck case, and a specialty case, designed for general display in small stores and for specialized display in large markets.

First three cases come in 7-foot, 9-foot, and 11-foot sizes; the fourth in 7-foot and 9-foot sizes, and the specialty case in one size only, 4 feet, 7 inches.

Cases are complete with aluminum fins and continuous tubing type cooling units, balanced to case load to maintain correct temperature and humidity conditions. Also available are Kelvinator scale stands, finished in Dulux, designed to be used in addition as a condensing unit compartment.

The stands are made in models to conform in shape to the complete line of Kelvinator display cases.

Three models are in the Kelvinator line of reach-in refrigerators, which are equipped with Kelvinator air-cooled condensing units operating in connection with the new "Octo-Fin" cooling unit.

Models include a 29-cu. ft. unit, designed for use in grocery stores, markets, cafes, hotels, hospitals, clubs, or bars; and two 46-cu. ft. units, one with five doors and the other with four. The four-door model is equipped with a long door, for the hanging of large meat cuts.

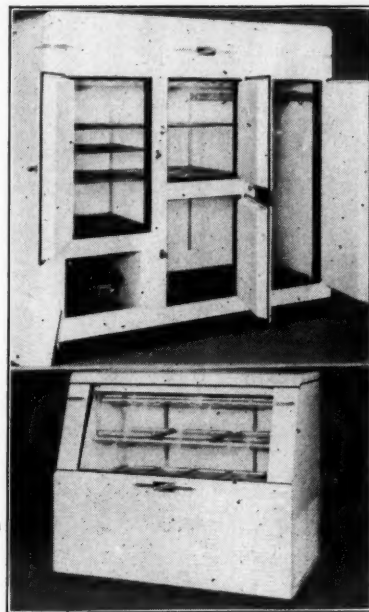
The 46-cu. ft. models are equipped with a 1/2-hp. Kelvinator condensing unit, and the 29-cu. ft. model with a condensing unit of 1/4-hp. capacity.

Merchandising of the reach-in and display case line will be made through Kelvinator's standard commercial and liquid cooling department, of which A. H. Reinach is sales manager.

Beauty School Air Conditioned

OMAHA—Capitol Beauty School has been air conditioned by Frigidaire equipment.

New Kelvinator Models



Illustrated are two models in the new Kelvinator commercial cabinet line, a large reach-in box at top, and the specialty display case below.

3 Frick Units Installed In Detroit Hospital

DETROIT—Three Frick refrigerating units are being installed by Detroit Ice Machine Co. in the modern new wing being added to Detroit Osteopathic Hospital, according to R. C. Doremus, chief engineer.

A 1 1/2-hp. methyl chloride unit will work on an ice maker having 10 50-lb. cans and a capacity of 1,000 lbs. of ice per day.

Another 1 1/2-hp. methyl chloride unit will supply refrigeration for a food storage cooler of conventional type.

A 20-hp. Freon unit, employing a new spray-type water cooler in which the refrigerant is sprayed over the tubes through which the water passes, is being installed to cool water for the air-conditioning system which will condition the laboratories and operating rooms.

All units are being provided with fully automatic controls, and are being placed in a fire-proof engine room in the basement of the building.

Fish Refrigeration Needed, Head of Florida Group Says

WASHINGTON, D. C. — More adequate cold storage facilities is the Florida fish industry's greatest need, C. M. Case, manager of the Fishermen's Cooperative Corp. of West Palm Beach, told a congressional committee here.

Mr. Case appeared in support of a bill to authorize government expenditures of \$50,000,000 on a campaign to encourage, through loans and otherwise, the formation of cooperative fish marketing associations.

Georgia Power Sales Off 30% in May

ATLANTA—Commercial appliance sales by Georgia Power Co. totaled \$32,880 during May, a drop of more than 30% compared with the \$45,725 in sales reported for April, statistics by the utility company show.

For the first five months of the year, commercial appliance sales were \$152,494, of which \$85,701, or about 57%, was for commercial refrigeration and water-cooling equipment.

Sales of ventilating fans increased more than \$2,000 during May, but no air-conditioning equipment sales were reported, total for the year to June 1 being but \$4,984.

In the cooking and heating equipment division, sales for the year's first five months totaled \$15,205, while water heater sales for the period were \$6,531.

Concentration on Best Prospects Breaks All Water Cooler Records

DETROIT—By concentrating promotional efforts on the best 100 prospects of each dealer, Kelvinator's standard commercial and liquid cooling sales division is this month breaking all records on water cooler sales, according to A. H. Reinach, sales manager.

The "Top Ten" plan which Mr. Reinach is sponsoring is directed toward the 10 best prospects in each of the 10 leading market classifications, which include business and professional offices, stores, and shops, restaurants and coffee shops, hotels and clubs, factories, hospitals and institutions, theaters, stations and terminals, banks and financial offices, and mortuaries.

Three direct-mail pieces, each including a return post card, are sent to these prospects. The cards are returned to the factory water-cooling sales office, and then mailed directly to the dealer for prompt follow-up. Third step in the campaign is a general follow-up on all prospects after the three mailing pieces are sent out.

Direct-mail pieces used in this campaign stress the appearance, economy, and dependable operation of the equipment, and play up the Kelvinator slogan, "more gallons of properly cooled water for every dollar invested."

Hughes to Air Condition Dayton Theater

DAYTON—Hughes Heating & Air Conditioning Co., Airtemp dealer, has been awarded the contract for conditioning the Thompson theater to be erected in Oakwood, local residential suburb.

The firm has also been awarded the contract for conditioning Gallaher Drug Co.'s Salem Ave. store.

THE **HILL** **ALL-PORCELAIN** *Reach-In* **REFRIGERATOR** IS




Better **ALL THE WAY THROUGH**

All-porcelain outside, all-porcelain inside, waterproofed sheet corkboard insulation, extra insulating board, hard rubber jambs, accessible coil chambers, take-down construction, special chromium-plated hardware—make the HILL Refrigerator better and easier to sell.

Send for 28-page catalog and discounts... using your business letterhead.

C. V. HILL & CO., INC.
HILL Products Division
Trenton, New Jersey



TIMKEN BEARING EQUIPPED

TIMKEN TAPERED ROLLER BEARINGS

TIMKEN, TAPERED, ROLLER BEARINGS have been proven by years of use in leading American automobiles. In your CURTIS COMPRESSOR, special, sound-proof type Timken Bearings add to the efficiency, smooth operation and long life. Unlike other types of anti-friction bearings, they provide for easy outside adjustment for wear if necessary.

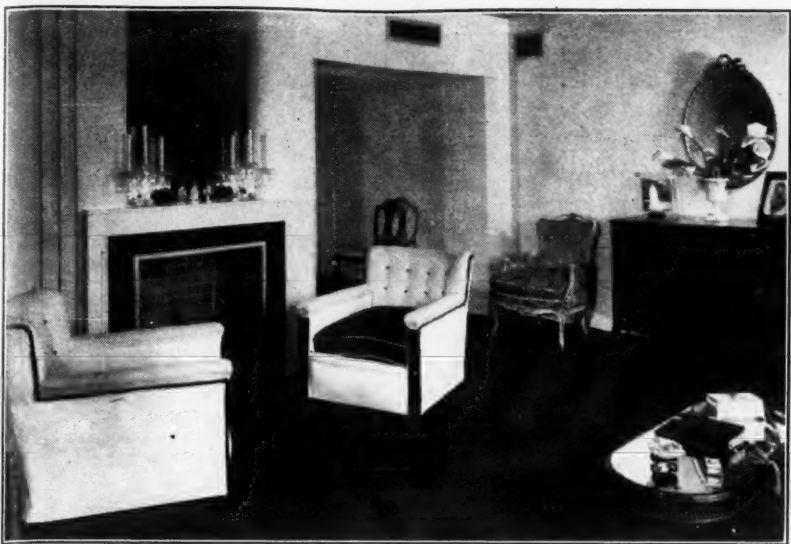
Timken Tapered Roller Bearings are another example of the advanced engineering that contributes so much to efficiency and care-free performance of the CURTIS Condensing Unit.

Represented in Canada by
Canadian Curtis Refrigeration Co., Ltd.
20 George St., Hamilton, Ontario

CURTIS

CURTIS REFRIGERATING MACHINE COMPANY
Division of Curtis Manufacturing Co.
1912 Kienlen Avenue, St. Louis, Mo.

In an Air-Conditioned Apartment



Typical living room in the air-conditioned Country Club Plaza, new apartment house in Birmingham, Ala. Note outlet grilles in the upper center and right of the picture.

Birmingham Apartment House Owner Finds That Air Conditioning Pays

(Concluded from Page 1, Column 5)
\$14,760 yearly income. With an operation cost of \$4,300 per year based on figures for the past six months, this means that this building will net \$10,500 or 7½% net on its construction cost of \$150,000 during the first 12 months of operation. We expect to raise rents shortly in line with a general increase in the city."

Air conditioning is provided by an Airtemp cold water installation, installed by Bromberg & Co. of Birmingham. Two inter-connected 15-hp.

compressors circulate cold water to the fan units, which are ceiling-suspended over linen closets except on the third floor, where they are placed in the attic.

Other basement apparatus consists of a water cooler of 100 g.p.m. and a condenser cooling tower capable of handling 8,000 c.f.m. of air.

The compressors are controlled by the leaving water temperature, one by an immersion thermostat set at 43° and the other by a thermostat set at 45°.

The entire system is automatic and protected by safety cutouts and is deemed especially suitable for an apartment house where there is a minimum of supervision, the only paid employee being a janitor.

Water is pumped to each unit at

the rate of 8½ g.p.m. through all copper tubing with sweat fittings. Cold water lines are covered with pre-shrunk wool felt covering. All piping rises through the linen closets, including a fresh air riser which supplies 250 c.f.m. of fresh air per apartment.

The equipment is designed to supply 1,200 c.f.m. of air for each of the six-room apartments and 900 c.f.m. for each of the six five-room (inside) apartments, or to provide 80° dry bulb temperature and 50%

relative humidity when the outside temperature is 95° dry bulb or 78° wet bulb.

The joist space over the third floor ceiling is insulated with four inches of mineral wool.

Short runs of galvanized metal ducts, furred into the hallway ceilings, serve each room with the exception of the kitchens, which are ventilated by 12-inch exhaust fans. The grilles of the Uniflow type are placed high in the sidewalls nearing the ceiling.

In the winter the system circulates, filters and tempers fresh air in connection with a regulation coal stoker-fed steam heating plant.

By means of hand controls tenants may regulate the air to suit their individual tastes.

Year-Around System Is Installed for Calif. Utility

RIVERSIDE, Calif.—Gay Engineering Co., Los Angeles, has installed a fully automatically controlled year-around air-conditioning system in the building of Southern Sierras Power Co. here.

Although Westinghouse CLS compressors are employed, the Gay Co. built many of its own engineering and design features into the system, which is said to maintain interior temperatures within a range of 1° although outside temperatures may vary from 25 to 118° F.

The system is started and closed at morning and night through an electric timing device.

Well water at 68° F. is pumped into the system by an electric pump, and circulated through the system by an additional pump.

The building is heated by a reverse cycle of refrigeration.

F. W. Jordan, Westinghouse air-conditioning supervisor on the west coast, cooperated with Gay Co. engineers in making the installation.

Canadian Pacific to Cool 250 Cars This Year

WINNEPEG, Manitoba, Canada—Shops of the Canadian Pacific railroad are working at full capacity to meet the demand for air-conditioned cars, and present plans call for modernization of more than 250 coaches by the end of the summer.

Completely air-conditioned tourist sleepers are beginning to appear on the company's lines, and all standard sleepers and diners of main line trains are now air conditioned. By the end of the summer it is expected that all tourist sleepers and some coaches will have cooling equipment.

Airtemp Announces New Distributors

DAYTON—Airtemp, Inc. recently announced the appointment of the following distributors:

Columbus Rudy Heating & Air Conditioning Co., Columbus, Ohio; Crawford, Inc., Jackson, Miss.; Frank Coal Co., Nashville, Tenn.; and Sharp Battery & Electric Co., Chattanooga, Tenn.

Shield Co. Furnishes Units For Fort Worth Theater

FORT WORTH, Tex.—Shield Co., Inc. furnished Westinghouse air-conditioning equipment for the New Isis theater recently opened here.

Keetch Mfg. Co. did the sheet metal work.

Bottling Plant Air Conditioned

ROCKFORD, Ill.—Mid-States Industrial Corp. has installed air-conditioning equipment in the new plant of Blackhawk Bottling Co. here.

New Firm Handles Cooling Equipment in Columbus

COLUMBUS, Ohio—Cooling & Heating, Inc. has entered the air-conditioning and heating field in Columbus.

The company has been appointed central Ohio sales representatives for the Zonolite Corp., Detroit; McQuay, Inc., Minneapolis; General Refrigeration Corp., Beloit, Wis., and a number of other manufacturers of air-conditioning and heating apparatus.

Officers of the new firm are: DeWitt H. Wyatt, president and gen-

eral manager; R. Glenn Osborn, vice president; Herman Trefflich, secretary and treasurer, and Victor J. Cardosi, a director of the firm and sales manager.

Nutting Heads Detroit Sales for Vilter

DETROIT—George Nutting has been appointed zone sales manager for Vilter Mfg. Co., Milwaukee, with headquarters here. He will supervise sales of Vilter air-conditioning equipment in the states of Michigan, Ohio, western Pennsylvania, and Kentucky.

SUCTION AND DISCHARGE VALVES ARE ASSEMBLED IN A COMPLETE VALVE PLATE UNIT FOR SIMPLIFIED REPLACEMENT



It rarely happens on a Brunner... but when the valves do "act up", the trouble can be corrected inside of a few minutes time. Yes, and you don't have to search for an expert—any mechanic can do it! The complete assembly of Brunner suction and discharge valves in a single valve plate means that by removing a few bolts, lifting out the faulty valve plate and installing a new one, the job is quickly finished without loss of service, without loss of refrigerant... The unique valve plate assembly exemplifies the advanced thinking behind every Brunner detail. Why not get better acquainted with the way Brunner Refrigerating Equipment is engineered for dependable service? * * Forty-seven condensing units and five compressor models for nearly all refrigerating and air conditioning requirements. BRUNNER MANUFACTURING COMPANY, UTICA, N. Y., U. S. A.

BRUNNER

BUILDS FOR *Greater* DEPENDABILITY

Anaconda Copper
REFRIGERATION TUBES
They Flare without cracking
THE AMERICAN BRASS CO.
FRENCH SMALL TUBE Branch
General Offices: Waterbury, Conn.



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Inside Story of a Worried Market

SO IMPORTANT has the market for American refrigeration and air-conditioning equipment in Palestine become that the recent hullabaloo over the proposed partition of the country has led a number of readers to inquire: "What's it all about? Are we going to lose one of our most active markets? Will it be worth our while to support the movement for America to take over the mandate?"

Just as the English press failed to prepare its people for the abdication crisis, so has the American press neglected to give its readers background on the dispute in Palestine. Not that American editors exercised any sort of self-censorship, as did the British; it was simply a case of underestimating the importance of the Jewish-Arab conflict, which has been heating up to the boiling point during the last few years.

A Menace to Peace

Fighting in Spain, "the rehearsal for the next European war," has so overshadowed the much less gory troubles in Palestine as to put the latter's nose completely out-of-joint in the eyes of cable editors. Yet the Palestine Problem is potentially a greater menace to world peace than the dogfight over control of Spanish mines, deplorable as the latter may be.

So when the British Royal Commission recently recommended dividing Palestine into three sections, which may roughly be designated as Jewish, Moslem, and Christian, a great cry broke out in the United States that Great Britain was reneging on her solemn pledge to give the Jews a national home in Palestine.

Emotional Outcries

At present the Hearst press is sponsoring a campaign of vilification against the British statesmen who proposed the partition. A

group of American senators, who were sent on a junket to Palestine earlier this year at Hearst's expense, are adding their protests to those of Jewish leaders.

In the English Parliament the Labor Party has forced the submission of the partition proposal to the League of Nations. And in Palestine both Jews and Arabs are voicing indignation at the idea.

All these outcries are highly emotional. American newspaper readers have had little or no opportunities to examine the facts in the case.

What Will Be the Effect on Business?

Is the partition of Palestine merely another example of the muddled diplomacy which has reduced the British lion's roar to a hoarse wheeze in the conduct of recent international affairs? Is it merely a sop to estranged Moslem opinion, a move to thwart or postpone another Holy War in the East?

More important to readers of this paper, does this proposal mark the end of the Palestine boom? Should promotional expenditures for that market be curtailed? Will the many Americans who have gone over there to sell American refrigeration products—and practically every American manufacturer is represented—shut up shop and go home?

The Inside Story

Informed Jewish opinion in Palestine—with which the editor of the NEWS has kept close touch in recent weeks—says, "No!" to all the questions in both preceding paragraphs. Palestine should continue to be a good market in coming years. Here's the inside story:

First of all, the partition may never take place. Even if it does, there will be two delays—that attendant to the hearing of the arguments before rendering a final decision, and the readjustment period. In the latter case, it is known that the Royal Commission favors at least a five-year interval before the actual division of the territory.

Delays Aid Jewish Cause

These delays all help the Jewish cause. Arab guerilla warfare has menaced Jewish lives, Jewish business, and Jewish expansion for a considerable period of time. Now that they have achieved at least recognition for their aims—the checking of Jewish immigration and Jewish land ownership at their present points—it is hoped and even expected that the sniping and bomb throwing will cease.

Furthermore, with their attention distracted from the Jews while the Powers debate the situation, the quarrelsome Arabs will have time to devote to their internal squabbles, in particular the feud between the powerful Nashashibi and Husseini families, and the struggle for political control of the Arabs between the Mufti of Jerusalem and the Emir Abdullah.

Britain Strives to Placate

The Mohammedans

That Britain is seeking to placate the growing resentment of Mohammedans toward their political masters in London is no secret. Mussolini has done all he can, through radio broadcasts and secret agents, to foster the festering. Downing Street well knows

that a Mohammedan insurrection might break up the British Empire.

This same insurrection, entailing a united front of Mohammedan peoples in the Near East, would undoubtedly wipe out the Jewish colony in Palestine, if it ever came to pass.

But to assume that Britain is "betraying its trust" in dividing Palestine just to quiet the mutterings of the Mohammedans is to admit an overhasty examination of the facts, and an oversimplification of the case.

A Breathing Spell For Jewish Palestine

Fact is, partition or the suggestion of partition will provide Jewish Palestine with a "breathing spell" which it should appreciate. Immigration has been coming in too fast to be assimilated and allocated properly. Large numbers of the expatriates have found it difficult to orientate themselves. The number of professional men to agriculturalists among the immigrants has been highly disproportionate.

Nevertheless, the Jews in Palestine have encouraged the too-rapid influx of immigrants for two reasons: (1) sympathy with their aggrieved blood brethren in Europe, and (2) desire for more manpower in case of physical struggle with the Arabs for control of the land.

As a result, there has been a concentration of immigration in the cities. New industries have not developed fast enough to provide work for the hordes of immigrants who would like to leave Germany, Poland, and Rumania for this new haven against oppression.

Development Can Proceed

True, the "breathing spell" will not help the unfortunate victims of discrimination in various European nations. But it can also be said that their economic plight in Palestine might be even worse if the country were allowed to fill up with immigrants well beyond its ability to take care of them and put them to work.

As the situation now stands, the work of assimilation, of stirring this melting pot of diverse racial ingredients, of developing the necessary small industries, of consolidating the national position, can now progress—and with less fear of Arab violence.

For the American exporter, and for the American engineers and merchandisers who would like to seek their personal fortunes in this exciting new nation, the present situation with regard to the Palestine Mandate should be considered rather more than satisfactory.

QUOTED

The Trailer, Menace or Mentor

After a series of discussions over a period of several months, the Detroit City Council Tuesday night (July 6) passed an ordinance regulating house trailers. This action still left the matter in discord because it was vetoed by Mayor Couzens. Two amendments were made, one reducing the license fee from \$20 to \$10, and other stipulating that wheels or tires cannot be removed except to make repairs.

Real estate men of Detroit have been watching developments in trailer regulation with keen interest. Property owners particularly have taken a militant stand against an unrestrained freedom for idlers, because of the use to which they have been placed as permanent homes.

In several parts of the city trailer camps have been established to offer accommodations to trailer owners for the 90-day period allowed by the new ordinance.

The growth behind the trailer-dwellings is primarily economic, and serious minds have given it careful study. There is more to it than just the fact that in many cases a trailer is unsightly when parked in a lot adjoining a residence, and presents a problem in sanitation. The trailer is carving out a new trend in living methods of the American public and opens a new field to business, a large part of which should accrue to real estate men and builders.

Joseph P. Day, known to nearly every real estate man for his accomplishments in that field, does not regard the trailer as a menace to real estate at the present time, and points out several important lessons that real estate men can learn from this type of structure.

"The trailer can teach architects and property owners several useful lessons," he says. "One is the lesson of compactness. Another has been suggested by William B. Stout, who sees in the trailer and in the process of trailer manufacture the predecessor of the pre-fabricated house."

"The trailer actually is a little house on wheels. A dozen or more substantial concerns are learning how to turn out these houses by mass production methods. If they can make a one-room house, it will not be difficult for them to manufacture houses of three, four, five and six rooms."

"The pre-fabricated house has not yet made much progress in the United States. If pre-fabricated houses can be turned out at a substantially lower price than the custom-made article, it is merely a question of time before house factories will be taking business away from house builders."

He may be right. The trailer was originally designed for traveling purposes, but the conveniences it offered for living made people see its usefulness for a permanent home. It is doubtful, however, if it will replace our standard residence to any extent. It will find its greatest acceptance among people in the low income group, and to regulate the trailer in such cases is just as necessary as it is to make restrictions in permanent real estate developments.

One of our acute needs is low-cost housing, and out of the improvement in trailer building is sure to come practical ideas that will help bring a solution to the problem.—*Real Estate and Building News (Detroit).*

LETTERS

Serviceman Gives Thanks For a Problem Solved

Alphonse Rousseau
2316 Fifth Ave., Trois-Rivieres, P. Q.
Editor:

With reference to your issue of June 30th, in which you have given me the "right answer" on "how to clean a water-cooled condenser," certainly I must thank you many times.

I have followed your suggestion, and it has been a real success; now we have the condensers running just like new ones. And it is saving us a whole lot of trouble and service calls, since our way of cleaning them before was nothing to compare to the way you have suggested.

Again I thank you very much, and hope that you will continue this "Service Man's" column, as it will be very helpful to all of us.

ALPHONSE ROUSSEAU.

Explanation of a Delay

318 Seymour St., Syracuse, N. Y.
Service Editor:

Sometime ago, Feb. 25, to be exact, I sent the necessary amount to cover the cost of an additional year's subscription to the NEWS and a copy of "Air Conditioning Made Easy," and up to the present time I haven't received it. Also I have been trying patiently to hold my temper with regard to my copy of the Red Book. Every issue of the NEWS that arrives I sort of lose interest in it, for I have rancor in my heart. Please do something.

R. J. CLEMENTS.

Answer: We can easily understand your annoyance because of the delay in getting a book which you ordered and paid for last February.

However, the Air Conditioning Manual is going to be much larger than we originally expected it to be and the price will be higher. Instead of one book, it will be a series of books (just how many, we do not know yet) each of which will be priced at \$1. The entire volume will be too large to be conveniently bound in one book. (However, you will get the entire set at the low combination price which you paid when you renewed your subscription.)

As you know, "Air Conditioning Made Easy," is still running serially in the NEWS and we do not yet have all of the type matter set, engravings made, etc. We are, however, getting the first manual ready to go to press and we hope to be able to forward copies of it very soon.

One of our difficulties is due to the prevalence of labor trouble in Detroit for the past several months. There has been an active union drive in all of the typographical trades and there have been several strikes.

We have had no trouble in our own shop but we have been indirectly affected because it did not appear advisable to increase the number of our shop crew under these conditions. Our regular shop force has been loaded with work since the first of the year and we have been running two eight-hour shifts steadily.

Our first job is to get out the weekly issues of the NEWS and these issues have been running considerably larger than last year with the result that we have not had sufficient extra time available to carry out our schedule of book production according to the plans made last fall when we announced the series of books.

If we had known what we would be up against, we certainly would not have announced these books until a few weeks before their actual appearance. At the time the announcements were made we felt confident that we could meet the schedule.

Regarding the Red Book, we are turning out these books as rapidly as possible and sending them out to the list of names in the order in which requests were received. Because of the unusual design of this book (it is really a portfolio of advertising matter and descriptive literature) it involves a great deal of hand labor in the bindery and we must frankly admit that it is a much bigger job than we had anticipated.

We appreciate your interest and we are just as much disappointed as you are because of these delays. We are working hard and doing the best job we possibly can to serve our subscribers.

'Orphan' Makes Data

Kelvinator
Division of Nash-Kelvinator Corp.
Detroit

Editor:

We believe that sometime ago you printed a list of all of the manufacturers who have ceased to do business in refrigeration or who have been taken over by other concerns.

Would it be possible for you to give us this information?

E. A. BARNES, Advertising Dept.

Answer: Among the information included in the 1936 REFRIGERATION AND AIR CONDITIONING SPECIFICATIONS BOOK is a brief corporate history of every company that has made household electric refrigerators, and this should give you the data you desire.

Cost Data for an Appliance Retailer

Alexander Grant's Sons
134-136 Genesee St.
Syracuse, N. Y.

Editor:

Will you please advise if you have published or have any information in your files on overhead costs for an appliance department.

If you do not have any such information yourselves, we would appreciate it if you could advise us where such information might be obtained.

F. I. GREENE.

Answer: The best figures we can give you are from the Dun & Bradstreet retail survey on operating averages in terms of percentages of gross sales for each of the expense items involved (of course, some of the items are grouped).

Figures for the Dun & Bradstreet surveys for 1933, 1934, and 1935, have been published in the March 6, 1935, Dec. 4, 1935, and Sept. 30, 1936 issues of REFRIGERATION NEWS, respectively.

In the June 2, 1937 issue of AIR CONDITIONING AND REFRIGERATION NEWS was published an article on a recent survey of the merchandising methods and practices followed by successful refrigeration dealers in Massachusetts, which was made by the Babson Institute and which should give you some helpful information on the cost of an appliance department.

He Wants Corks to Seal Tubing Holes

Independent Refrigeration
Service Repair Co.
2128 St. Joseph Ave.
St. Joseph, Mo.

Editor:

Am writing to find out if you can furnish me with the name of a firm that makes rubber corks to seal the tubing hole in meat cases, coolers, etc. These corks are about 1 1/4 in. in diameter and have the holes punched in them for the 1/4-in. tubing and 1/4-in. tubing.

Answer: Can any reader supply this information?

THE AIR AGE

BY F. O. JORDAN

Some Impressions of the Air-Conditioning Field

"Busy but friendly," was the outstanding impression received regarding the air-conditioning industry during a recent four-day jaunt to that overpopulated community to which the conventional side-walker from New York fondly refers as the "metropolitan area."

Should the jaunt to the regions where they make air conditioning be started under the cloud of that popular delusion which says that air conditioning is only a cooing industrial infant, too young to be free from danger of sudden drastic change in its nature or disposition, and too immature to possess established procedure or tradition, the so-called mind of the jaunter would be in for a real shock.

For instead of finding the manufacture of air-conditioning products carried on in a metropolitan alley shop, or at best, in a disused corner of somebody's plant which really does something else for a living and merely carries air conditioning along as something to charge off as a dead loss when the income tax comes around, the visitor discovers that air-conditioning products are being manufactured in plants devoted solely to air conditioning so huge and prosperous that they may expect to be in line for Senatorial investigations most any day.

And instead of coming around the mountain out of the tall timber in Pennsylvania upon a hill-billy village where a few air-conditioning units are made by hand now and then by the village swains, one discovers manufacturing towns with many of the most approved objectionable features of manufacturing centers, surrounding plants which rival many automotive manufacturing establishments for size and evidence of industry.

For example, a tour conducted personally by the general manager of its air-conditioning department discloses a huge plant with many buildings where 80 odd production-busy acres are given over to fabrication of air-conditioning equipment and allied products, where the foundry alone is larger than the average manufacturing establishment; where castings huge and small go on their respective ways through the various processes intervening between the roaring blast furnace and this finished product per the ritual long established by years upon years of manu-

facturing air-conditioning equipment with all the methodical surety of another Ford's; where the research laboratory building alone by comparison would dwarf many good-sized manufacturing plants.

After a visit to such a plant as this, and there are several of them, any preconceived notions as to the amateur state of air conditioning will be shed like a flannel shirt in July.

And not only are these air-conditioning manufacturers well established, but they are plenty busy too. Everywhere executives are occupied in answering subordinates who dash in and out with sheaves of papers, instead of being in the habitual "in conference" trance characteristic of depression periods; everywhere engineering departments wear that expression of abstract concern for which the engineer is noted when he is busy, instead of the look of concerned abstraction characteristic of the breed when trying to look busy; everywhere tough production departments are on the defensive with regard to sales departments, because the units cannot be produced fast enough to satisfy the rampant salesman.

Everyone seems to be in agreement that in general the problem is not to locate prospective customers, but to decide which prospect will make the best paying customer.

Of course, the market for residential summer air conditioning is another story, and all are agreed upon that one too. For the unanimous story is that readiness on the part of Mr. Homeowner to part with his cash in return for having his home cooled is trailing far behind his vociferously expressed desire for cooling it, and everybody seems to agree that the cure for this ailment is an educational program which will teach Mr. Homeowner the "whole truth and nothing but" instead of the fireside science to which he has been exposed via the Sunday Supplement.

And the rumor seems to be that the ACMA might even try something constructive like that.

Also commonly agreed among the manufacturers visited was the statement that a serious handicap to the continued rapid growth of the air-conditioning industry is the lack of trained and experienced men to carry on its work, and all manufacturers are making serious and extensive efforts to remove this handicap by various types of training intended to not only train men for the industry properly, but also to keep them

in step with its developments and improvements.

Both engineering and production obviously are much nearer standardization than they were a few years ago, not merely in time but in fact as well. In support of this contention were the statements everywhere that no longer is there the extreme variation in competitive bids so disconcerting to the prospective customer of a few years ago, and the obvious similarity of production methods and processes and assembly lines which were found in all plants.

One of the greatest variations in production methods was the diverse ways employed to accomplish that very important chore of removing all foreign or abrasive materials from the interior surface of the compressor casting before it is connected into the final closed refrigerant system. But everybody takes care of this problem somehow.

As to field or application engineering procedure, there was found to be a certain amount of agreement to the effect that there is not much possibility for satisfactory simplification of this work in connection with the large complex project be-

cause of the great variation of conditions upon each job.

Generally it is believed that the best way of reducing costs on this type of air-conditioning project is to train the engineer so well that he will make load estimates with the highest degree of accuracy, and equipment selections which are the most effective and economical.

However, for the smaller more standardized type of installation, it is commonly conceded that engineering overhead costs may be materially reduced by adoption of simplified rule-of-thumb standards of procedure which do not bother with factors of inconsequential effect upon loads, but which give due consideration to factors whose influence warrants taking them into account.

Probably the greatest diversity of opinion among the leading manufacturers is in connection with field engineering methods, for their viewpoint largely depends upon the section of the industry with respect to equipment size in which they are interested.

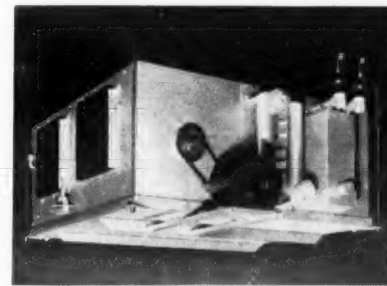
Concerns which specialize in the heavy portion of the industry lean toward lots of application engineer-

ing in the field, while manufacturers who look upon the smaller unit air-conditioning field as their territory, yearn for the simplified or "canned" variety of engineering.

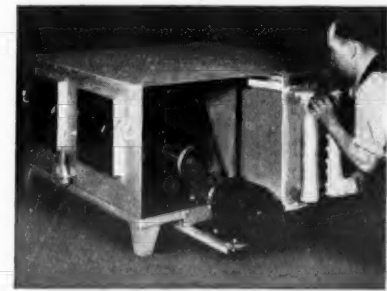
But probably both of them are correct. For when one 10,000-ton job is being engineered, no bets may safely be overlooked. But when 10,000 one-ton jobs are to be engineered, production methods are necessary in engineering them as well as on the assembly line, or costs cannot be forced down to where they are within the financial reach of 10,000 air-conditioning minded families.

So the picture is one of an industry which is prosperous, yet wondering about that residential market which eventually must take up the slack to result as the commercial market approaches saturation; which approaches standardization but yet has some distance to travel before all of the lost motion is eliminated; and which has advanced far enough technically that further improvements must come only as gradual developments rather than as revolutionary changes which will render obsolete, any air-conditioning equipment sold this year.

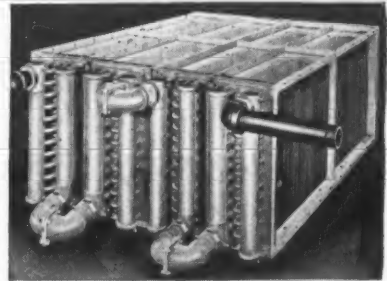
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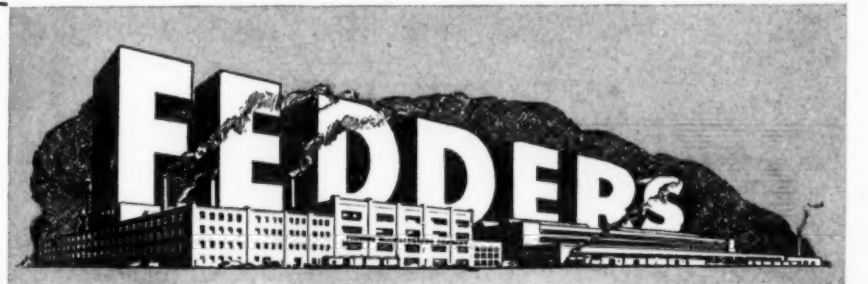
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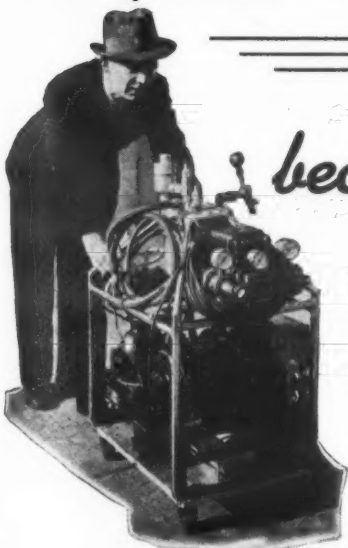
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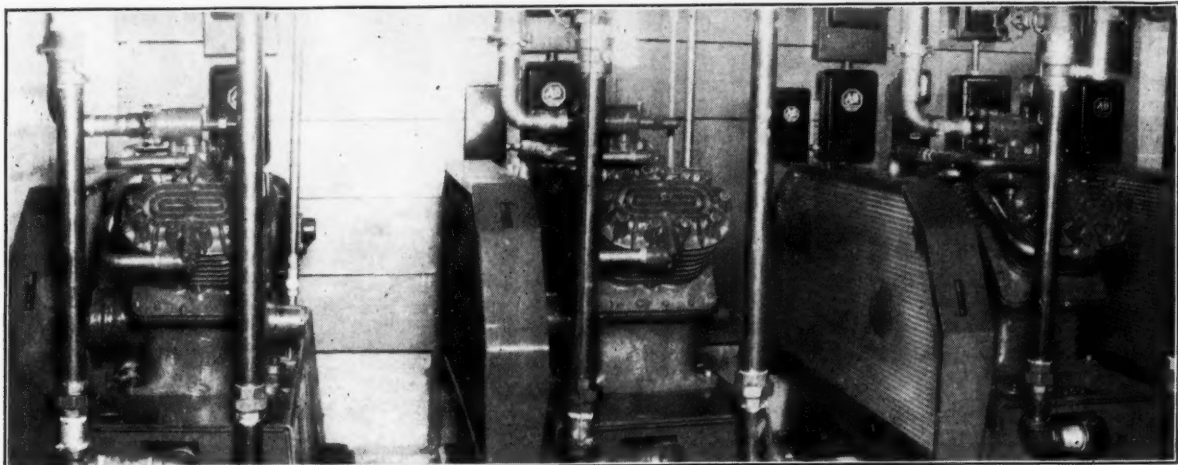
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Multiple Unit Brunner Installation in Theater



View of three of the four Brunner condensing units used in making a multiple installation in the Military Theater, Omaha, recently. The condenser of the fourth unit may be seen at the right. The machines installed are Brunner Model W-1500's. An Allen-Bradley control system is employed.

Multiple Brunner Units Used in Omaha Theaters

OMAHA—Multiple installations of Brunner condensing units have been made to cool two leading theaters here by Ballard & Lewis Co., Brunner distributor.

Four W-1500 (15-hp.) Brunner compressors have been installed for the Military theater, and three W-1500 units have been installed to cool the Avenue theater.

Ward Installs System in Fresno School Offices

FRESNO, Calif.—Edward B. Ward Co., Westinghouse air-conditioning distributor, has completed installation of a year-around Westinghouse system in the School Administration Building here.

Several individual conditioning units were placed in various parts of the building under thermostatic control to condition separately certain rooms.

Standard Westinghouse evaporators and steam coils were used in the installation. Automatic control is supplied by thermostats for the motorized steam valves, and electrically operated solenoid valves for the liquid refrigerant.

The condensing unit is controlled automatically by Mercoid pressure controllers.

The E. B. Ward Co. has served as Westinghouse representative in certain sections of California for the past three years. Air-conditioning installations made by the company range from 1/2-ton self-contained Mobile units to 200-ton jobs.

The company now has five engineers on its staff.

Natkin Air Conditions New Oklahoma City Theater as Another in Series of Systems Installed for Standard Theaters Chain

OKLAHOMA CITY, Okla.—Westinghouse air-conditioning equipment is being installed by Natkin & Co., local Westinghouse air-conditioning dealer, in the new Tower Theater, one of the Standard Theaters chain owned by Joseph Cooper of New York City, whose company owns and operates many theaters in Nebraska, Colorado, and Oklahoma.

No new venture for Mr. Cooper is this purchase of theater air conditioning from Natkin & Co., for the first deal of this kind between the Cooper and Natkin organizations was made about 10 years ago, when a 100-ton carbon dioxide installation was made in the Stuart Theater at Lincoln, Neb. Since that time installations made by Natkin & Co. for Mr. Cooper include the 60-ton carbon dioxide plant in the Criterion Theater in Oklahoma City, and the multiple compressor installation for the Lincoln Theater in Lincoln, Neb.

The Tower Theater air-conditioning installation is to be an all-year system, making use of a gas-fired steam boiler with steam heating coil, and a humidifier for winter heating and humidification, as well as a cooling and dehumidifying coil with three 25-hp. Westinghouse direct-connected Freon-12 compressors for summer conditioning.

Because of the high cost and the high prevailing summer temperatures of available condensing water in Oklahoma City, a Buffalo Forge evaporative condenser of 65-ton refrigerating effect is to be installed.

With limited space in the basement, and because of the difficulty of installing condenser cooling air ducts from the basement to the exterior of the building, the condenser is to be located outside the building about 12 feet above the alley. This location should result in an unlimited supply of condenser cooling air, as well as immediate diffusion of the heated air after being discharged from the condenser, while no space is occupied by the condenser that could be used to other advantage.

The remainder of the air conditioning and the refrigerating equipment is to be located beneath the stage.

Conditioned air is to be distributed by means of well insulated supply ducts which will rise to the attic space, whence they are to supply the air to the theater through long narrow Uniflo grilles, and to the lobby through plate type ceiling diffusers. Air is to be supplied also to the ticket office through a centrally located ceiling grille. Recirculation of air is to be from the orchestra pit to the air-conditioning equipment through one large return.

The equipment is to be divided into three separate refrigerant circuits, each circuit having its own compressor, air-conditioning coil and evaporative condenser coil.

It is believed that this arrangement will result in maximum flexibility because it will allow operation of only such of the equipment as is necessary for the existing refrigeration load, and will be the utmost in dependability because it is considered highly improbable that any possible breakdown is likely to affect more than one third of the plant at the same time.

The entire refrigerating plant will be under fully automatic control at all times, so that the compressors will "cycle" individually as needed, according to the demands of thermostats to be located in the common recirculated air intake.

Rapp Completes 200-Ton System in Dept. Store

BROOKLYN, N. Y.—Walter E. Rapp has completed installation of a 200-ton air-conditioning unit in McCrory's department store here.

Anaconda Copper Refrigeration Tubes

Easily Bent!

THE AMERICAN BRASS CO.
FRENCH SMALL TUBE BRANCH
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Modern Air-Conditioning Equipment Cuts Out Annual Cost of Reconditioning Old CO₂ System in Miami Theater

MIAMI, Fla.—To avoid increasing costs of annually tearing down and reconditioning its former carbon dioxide air-conditioning plant before summer weather set in, Capitol theater here has completely modernized its conditioning system with General Electric equipment.

Efficiency and economy demonstrated by the new installation's first six months of operation, according to Mitchell Wolfson, executive director of Miami Wometco theaters, indicate that the new plant will more than pay for itself in a few years.

After making a survey of the old plant, engineers of General Air Conditioning Corp., G-E distributor, designed a set-up including two air conditioners, new distribution outlets, and three G-E 20 hp. condensing units, automatically and thermostatically controlled, to replace the antiquated 125-hp. compressor.

The old blower and blower motor, being of adequate capacity, were retained.

Factory built and stationed in the equipment room, the conditioners were arranged to operate as a single 66-ton unit. The three new com-

pressors were built into the conditioning machinery at the factory.

Since the cooling water, obtained from a well, was known to be seriously corrosive, the new condensing units were constructed of corrosion-resisting materials.

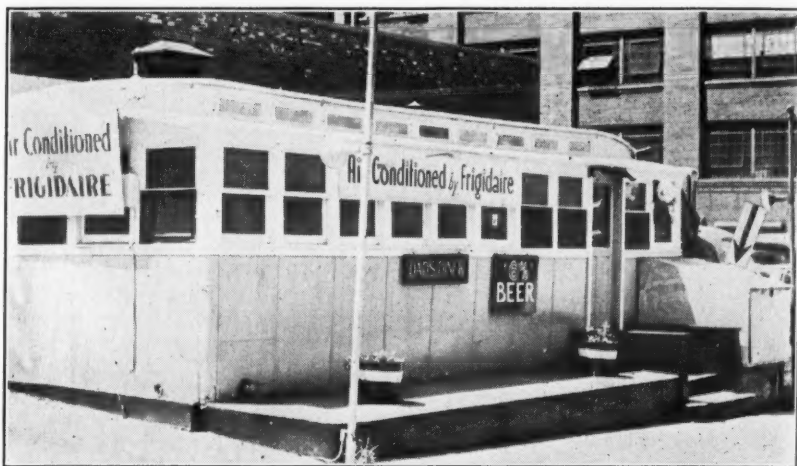
Now compact and easily controlled, the entire air-distribution equipment conforms to standard requirements, it is said.

Savings in operation are provided by flexibility of control. During periods when only a few people are in the theater, a single 20-hp. unit takes care of the load formerly carried by the 125-hp. one.

Automatic control allows for more ventilation and less refrigeration on cool days, while on extremely hot days it reduces the amount of outdoor air used to permit a smaller capacity to accommodate occasional peak loads.

Maintenance savings were secured by avoidance of the annual tearing-down process, which required the services of an engineer and assistant. Material and parts for the former equipment, it is reported, were becoming increasingly hard to get.

Meeting a Space Shortage Problem



Ingenuity of L. R. Krumm Co., Delco-Frigidaire distributor in Columbus, was taxed to the limit in installing a cooling system in the above diner, claimed to be the first installation of its kind in the country. The company solved the problem by using an outside shelter for the condensing unit.

Outside Shelter Solves Space Problem in Cooling Diner

COLUMBUS, Ohio.—Installation of the condensing unit for the air conditioning of a "Pullman" diner in this city taxed the ingenuity of the engineering department of L. R. Krumm Co., Delco-Frigidaire air-conditioning distributor in the Columbus territory.

Space in a stationary Pullman diner is a premium. Everything is compactly placed and installed, and in the particular diner in question there wasn't a foot of space to spare. It was a case of either enlarging the diner, or finding some special place to house the compressor and other parts of the condensing unit.

The Krumm engineers finally solved the problem by constructing an outside shelter for the compressor. At the side of the steps in the above photograph will be seen the "doghouse" made of sheet metal in which the 3-hp. compressor was placed.

Installation of the suspended-type air conditioner was a little easier. A section was cut into the ceiling of the diner at one end, into which the air conditioner fitted snugly. The cool air was then blown right down the top of the diner through the entire length of the car.

Fels & Co. Building Is Air Conditioned

PHILADELPHIA—Fels & Co. has installed a year-around air-conditioning system in its office building at 73rd St. and Woodland Ave. for the comfort and efficiency of employees.

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Melchior Display at 1937 Paris Exposition Demonstrates Control Systems & Other Modern Cooling Equipment in Action

Harry G. Noordberg
European Sales Manager
Melchior, Armstrong, Dessau Co.
300 Fourth Ave., New York, N. Y.
Editor:

The 1937 Paris International Exposition being held in Paris, France, this summer provided an excellent opportunity for us to display, in the Palais du Froid (The Refrigeration Palace), the latest developments in American-made refrigeration equipment, which we distribute to the export industry.

Following our decision to participate in this exposition, came the problem of how to display our products effectively. After giving consideration to the complex nature of refrigeration equipment and component parts, we decided to display by means of "a working model," showing the several major items under actual operating conditions.

The physical layout of the working model was to a large degree left up to the writer. With the able assistance of one of our French clients, we built a specimen commercial refrigerator with five compartments.

Purpose of five compartments is to provide a separate insulated space, in which five different refrigeration functions and temperatures could be maintained, to demonstrate under

suction line, is adjusted to allow a minimum suction pressure of 14 pounds. At 14 pounds suction pressure, in this installation, the expansion coil maintains a coating of ice and the water bath temperature is slightly above 32° F.

A dial thermometer (easily observed on the panel board) with the bulb in the water bath, allows for ready determination of the temperature maintained.

A standard compound gauge, also located on the panel board, allows for observance of the suction pressure maintained by the constant pressure valve. Kerotest diaphragm packless line valves are used in the liquid and suction line to allow interested visitors to operate any part of the system separately, if desired.

ICE MAKER HOOKUP

Cabinet B, the ice cube maker, is directly connected into the main suction line, to provide for the lowest prevailing suction pressure. A Kerotest G-W control (check valve) is installed in the suction line near the ice cube maker to prevent warm gases from the higher temperature evaporators from re-entering and condensing in ice cube maker coil.

Cabinet C is the storage compartment with the unit cooler operating on a defrosting cycle. To provide a

Instructive to the Service Man

Here is an interesting and instructive article on the use of various pieces of refrigeration equipment, as displayed for European refrigeration service engineers at the 1937 Paris International Exposition by Melchior, Armstrong, Dessau Co., jobber and exporter of refrigeration parts and supplies. A variety of uses of snap-action and constant pressure valves and related control equipment is described and explained.

Mr. Noordberg played host to the editor of the NEWS in both France and Holland last year. His firm supplies "the makings" to most European manufacturers (or assemblers) of refrigeration equipment.

actual conditions such equipment as compressor, evaporator, temperature control, two-temperature control, thermo expansion valve, shut-off valves, gauges, recording gauges, thermometers, etc.

DISPLAY CONSTRUCTION

The five-compartment refrigerator, with all of the equipment installed and in operation, is shown in the accompanying illustration.

The refrigerated spaces are well insulated and the compartment doors are of typical refrigerator construction having three glasses.

The separate compartments or cabinets may be identified as A, B, C, D, and E.

Cabinets A, B, D, and E inclusive have a single door, while cabinet C is twice the size of the other cabinets and has two doors.

The refrigeration equipment in each of the five compartments performs a separate and individual function, and is operating at separate temperatures. All of the five compartments, however, are connected to one model 250-MC ½-hp. air-cooled Merchant & Evans condensing unit, using methyl chloride as the refrigerant.

Observing the illustration from left to right cabinet A represents a sweet water bath; cabinet B an ice cube maker; cabinet C a storage room with a Fedders "Forcedraft" unit cooler; cabinet D a second storage room equipped with Fedders-R-Fin coil and Fed-R-Vex baffle; cabinet E a low-temperature brine tank.

Each separate evaporator is equipped with a thermostatic expansion valve.

The real value of this typical installation is to familiarize and instruct observing service men, dealers, manufacturers, engineers, etc., in the various phases of refrigeration and the available equipment for maintaining many desired temperature combinations and conditions.

THE FIVE SYSTEMS

An explanation of the five systems and the equipment involved is given as follows:

Cabinet A comprises a sweet water bath coil, which may be used for cooling any beverage. A direct-expansion coil is submerged in a vessel of water. A thermo valve controls the flow of refrigerant into the coil and a Fedders CP-35 constant pressure valve, installed in the

separate and individual cycle for this blower unit to result in an average refrigerator temperature of 36° F., a snap-action two-temperature valve is employed.

In this particular application the unit cooler is oversize and it was necessary to block off a part of the circulation from the fan. With the circulation retarded, it was found that a setting of 26 pounds cut-in and 9 pounds cut-out on the snap-action valve was satisfactory.

A special fan control, comprised of a Detroit Lubricator RB-3 low-pressure control, breaks the circuit to the fan at 10 pounds suction pressure. Purpose of this "reverse acting control" is to cut the fan out just before the snap-action valve cuts out. The control cuts the fan in at 25 pounds suction pressure and the consequential pressure increase in the evaporator immediately cuts the snap-action valve in at 26 pounds pressure.

To provide a ready means of demonstrating the operation of the snap-action valve, a three-way packless valve is connected from the liquid to the suction line of this circuit. By opening this by-pass valve, pressure from the liquid line responds on the bellows of the snap-action valve causing it to cut-in. When it is desired to show the cutting-out of the snap-action valve, the main liquid line valve is closed and the evaporator pumps down to the cutting-out point immediately.

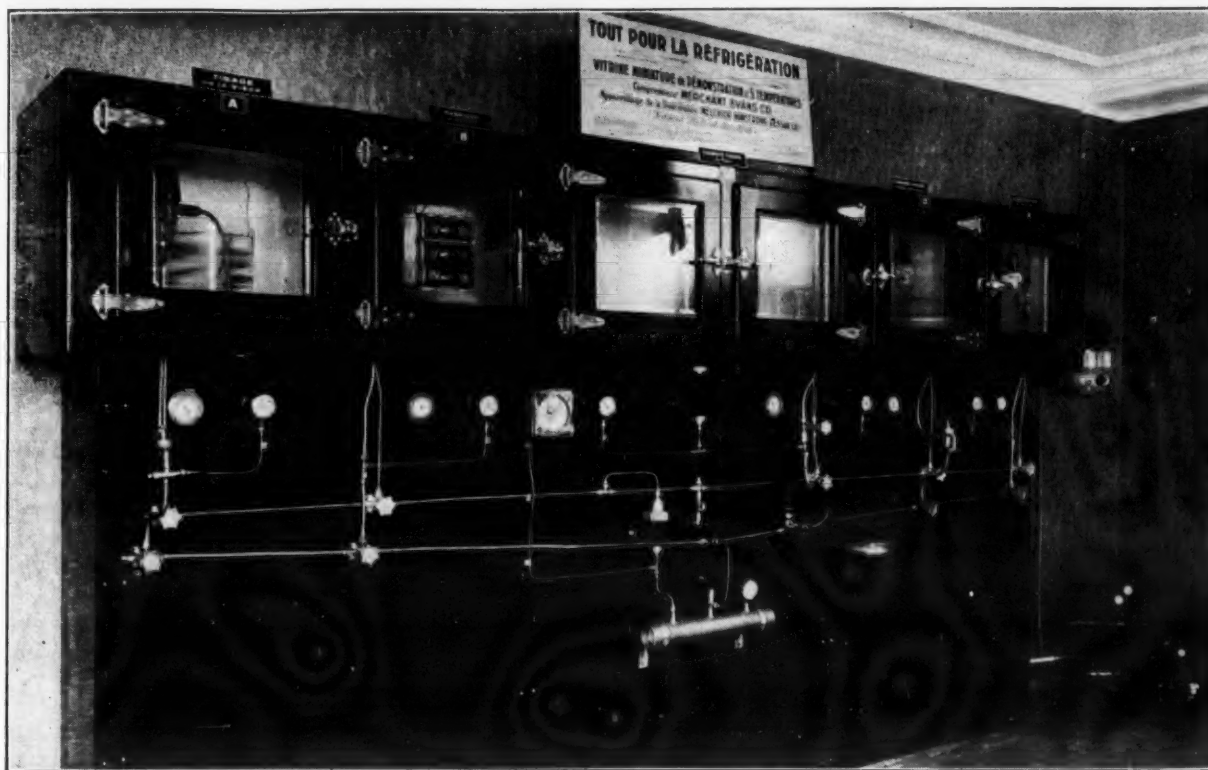
The reverse-action fan control, being connected into this circuit, also operates when demonstrating the snap-action valve.

SECOND STORAGE CASE

Cabinet D has the correct evaporator capacity for an average temperature of 37° F. To insure against possible lower temperatures caused by long running periods of the compressor, a constant-pressure valve is installed and adjusted to a minimum suction pressure of 14 pounds.

Cabinet E is a brine tank made up for this purpose by submerging a

Melchior's 5-Compartment Demonstration Set-up at Paris Fair



direct-expansion coil in glycerine.

This circuit is connected directly into the main suction line and the temperature of the brine (glycerine) is maintained at minus 14° F., with a low-pressure control setting of 0 pounds cut-out.

As this evaporator, like the ice cube maker, is operating at a lower temperature, a check valve is used to prevent warmer gases from enter-

ing and condensing in the colder coil during the idle period.

A 13-gallon surge tank is installed in the main suction line. Purpose of this tank is to prevent short cycling of the compressor in the event that a large part of the load is off at certain periods.

This surge tank provides a storage or surplus of suction gas sufficient to keep the compressor control on

or off when an unbalanced load would otherwise cause short cycles.

The miniature demonstration is very popular and is observed daily by many refrigeration engineers and service men. Much favorable comment is made on this practical manner of demonstrating how refrigeration control equipment operates and is adjusted.

HARRY G. NOORDBERG.

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● Always a leader in the manufacture of glass containers, the Owens-Illinois Glass Company, in recent years, has broadened the scope of its activities to include the development and manufacture of glass products for use in other fields. . . Among these new products Fiberglas Insulation stands forth conspicuously because it completely fulfills the demand for a chemically stable insulating material, made under a

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All the resources and experience gained from more than sixty years of glass production and fabrication have gone into the development of Fiberglas. Exhaustive research, sound engineering practice and elaborate experimentation have contributed to making Fiberglas the most advanced development in insulation.

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6. Non-absorption of Odors.
7. Fungus- and Bacteria-Proof.
8. Light Weight.
9. Non-inflammability.

10. Permanence.
11. Resistance to Acid.
12. Sound Absorption.
13. Resiliency and Flexibility.
14. Availability in Different Fiber Diameters and Lengths.
15. Availability in Different Densities.
16. Adaptability to Combination with Other Materials.

For detailed information about the use of Fiberglas Insulation in refrigerators and coolers, write Industrial and Structural Products Division, Owens-Illinois Glass Company, Toledo, Ohio.

The Owens-Illinois Glass Company also manufactures Insulux Glass Block, Dust-Stop Replacement-Type Air Filters and Fiberglas Insulation for all types of industrial use.

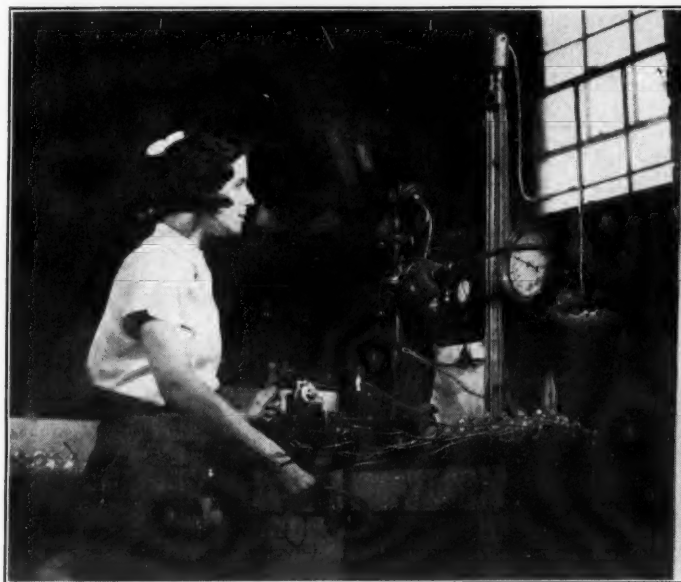
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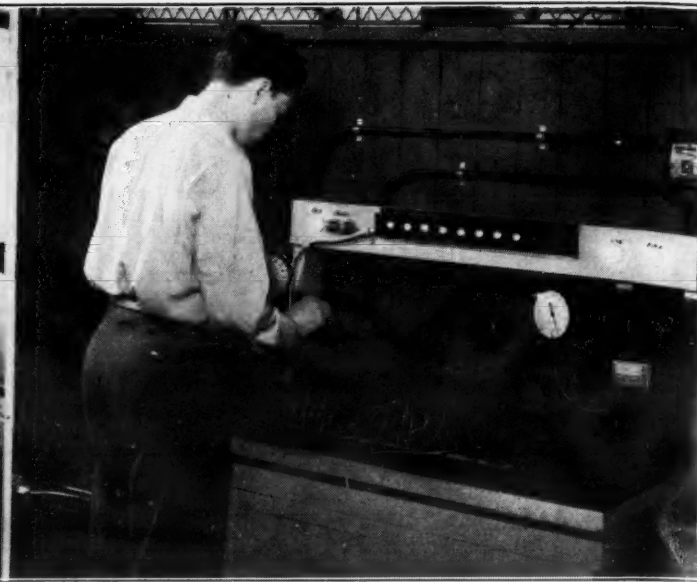
How Engineers in an Electric Refrigerator Plant Use Modern Test Methods To Insure Satisfactory Performance & Dependability (Pictures Taken in Fairbanks-Morse Plant)



Thermostatic expansion valve test. All valves used are tested in this fixture for operating characteristics. The feeler tube is immersed in a brine tank maintained at 32° and with a pressure of between 50 to 70 lbs. on the inlet side, the outlet pressure of the valve must hold between 2½ and 4½ lbs. pressure. The outlet from the valve is then closed off and the needle must show no leakage for a period of one minute. After this test, the feeler is immersed in water at room temperature and the outlet pressure must rise and hold at between 5 and 7 lbs.



Evacuating the system. In this view three operators are evacuating the evaporator and liquid and suction line connections prior to permitting the entrance of SO₂ which up until this time is contained in the unit receiver. The air pressure is being watched on the manometer located on the left-hand side of the test panels. The air in the system is exhausted to within less than 1/10 inch of mercury, this pressure being so low that it will cause water to boil at a temperature of 54°. After the system has been exhausted to this point, the pump is cut off and the system left connected to the manometer. A slight leak in the system will be immediately indicated on the mercury manometer.



Temperature regulator inspection. The temperature regulators (cold controls) are being inspected for range and differential. Brine is circulated through a tank in the test fixture. The temperature regulators are mounted on the rack just above this tank with the bulbs inserted in the brine and the brine temperature is reduced until the controls open the circuit. This is indicated by the signal lights above and to the rear of the control rack. When the dial thermometers at the ends of the tank indicate the cutout temperature for which the controls are supposed to be set, all signal lights must be out.



As they progress along the assembly line the refrigerators are constantly protected by their shipping cases, to assure unblemished finish when all work is completed. Note how the evaporators are wheeled up to the assembly line.



(Left) Positive protection against overload failure. Each motor and overload relay assembly is tested to determine whether or not the overload relays are set to pre-determined specifications. The synchronous clock on the left-hand side records the number of seconds that the motor stays on circuit with locked rotor before the overload trips and interrupts the circuit. The synchronous clock on the right records the number of seconds between the interruption of the circuit and the restoration of the circuit. Overload relay must trip in a time interval between 20 and 45 seconds for the motors to be acceptable.

(Center) No. 1 hot room with Earl McMinn as engineer in charge. On the left-hand side of this room



is the instrument panel board. The room is provided with four test stations so that four refrigerators may be tested at one time. On the panel board for each station is a graphic pressure gauge for recording the changes in head pressure and suction pressure, a kilowatt hour meter registering to a 1/100 of a kilowatt hour, a synchronous clock for determining the actual running time of a refrigerator.

(Right) Scientific sound level measuring instruments are used to insure quietness of operation. Pictured here is a refrigerator in a sound-proof booth being measured for quietness. The operator is holding a contact microphone against the unit and is noting the decibel indication on the instrument dial.

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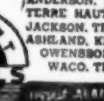
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ASHLAND, KENTUCKY.....VENTURA
OWENSBORO, KENTUCKY.....OWENSBORO
WACO, TEXAS.....RALEIGH

PICK in print should appear



Ohio Area Apex Outlet

PIQUA, Ohio—Appointment of Berner & Vallery, local Apex dealer, as distributor of the complete Apex line in the south central part of Ohio, has been announced by Apex Rotarex Corp.

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**ARTIC THE PREFERRED
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General Electric Co. Orders Up 59% for 6 Months

SCHENECTADY—Orders received by General Electric Co. the first six months this year amounted to \$217,265,619, an increase of 59% over the amount received the same period last year, President Gerard Swope has announced. The record first half-year was in 1929, when orders totaled \$220,716,456.

Orders received during the second quarter of 1937 amounted to \$111,518,589, compared with \$77,398,718 during the corresponding quarter of 1936, an increase of 44%.

York Supply Names 4 New Dayton Leonard Dealers

DAYTON—Three new dealers have been appointed by York Supply Co., Leonard distributor. They are Dilgard Sales Co., Dayton; Hayes Electric Co., Bellefontaine, Ohio; and Adair Furniture Co., Xenia, Ohio.

Spicer in New Showrooms

NEW LONDON, Conn.—Spicer Ice & Coal Co., Inc. handling General Electric and Coolerator refrigerators and other appliances, has opened new showrooms at 16 Bank St. William Roy is manager.

TAG Snapon Controls FOR REPLACEMENT profits

For Domestic Refrigerators, Water Coolers and Beverage Coolers, TAG Snapon Controls with overload protection, fit your service jobs perfectly and profitably. Once adjusted, they permanently retain their temperature setting. Once set, the mechanism is locked against creeping. Send for the 1937 TAG Snapon Control Catalog No. 1136-25. It contains other test equipment for refrigerator service that you should know about.

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FOREIGN TRADE

Philippine Gold Boom, Added to Vision of Independence, Boosts Refrigeration Market There

MANILA, P. I.—Visions of independence after 400 years of domination by other countries is enough to make even stolid Orientals sort of perk up and kick their heels together. Add to this elated feeling the intoxicating stimulus of a gold boom and they could be forgiven for staging an impromptu cork-popping party.

The Filipinos, under the United States flag since 1898, are in this position today. With complete independence assured in 1946 by the Tydings-McDuffie law, they now have prospects that it might become a reality as early as 1938. And the Philippine Islands are now riding the crest of a gold boom with mines producing in excess of 40,000,000 pesos worth of the yellow metal annually (\$20,000,000).

Business leaders are unanimous in declaring business to be fine and these 7,000 islands to be a land of opportunity—a young nation with unlimited resources on the brink of real development. Gold and independence are the big headlines of the day; the immediate future of the islands is tied up with each.

GOLD PROSPERITY

Gold has been mined in the Philippines since 1922. But the real impetus came around 1934 when the price of gold rose to make large scale mining worthwhile, and when capital became available in sufficiently large amounts to open up new fields. The richest producing field is on the island of Luzon about 60 miles from Manila, although extensive deposits have been discovered on the southern island of Mindanao. The output in 1932 was valued at only 10 million pesos (\$5,000,000). This jumped to 31,436,028 pesos in 1935 and was more than 40,000,000 pesos in 1936.

Manila has three stock exchanges. A seat on the Manila stock exchange costs 80,000,000 pesos, more than one on the London stock exchange. Where there's gold there's speculation, but the level heads are exhorting the people with a fervor which smacks of camp meeting preaching not to play the stock market.

The Filipino is described as the greatest gambler in the world, one who would rather place a bet on a cockfight than auction off his mother-in-law. Fearful that this trait might bring about the collapse of the gold market, authorities have issued frequent warnings urging the people to stick to cock fights if they must gamble. If the cock loses, the owner at least has chicken for dinner. The stock market loss leaves nothing.

INDEPENDENCE GUESSES

The independence situation has everyone guessing. Of perhaps 50 persons interviewed on the subject, an equal number stuck up for each of these opinions: The Filipinos do not want independence; the Filipinos will get independence in 1938; they are not capable of governing themselves; Uncle Sam will never leave the islands; as soon as the United

States steps out, the Japanese will step in; and the Filipinos are governing themselves now.

The Filipinos have been gradually taking over all governmental positions until they really are running their islands today. The official U. S. stand is expressed in the Tydings-McDuffie law, providing for a 10-year transitional period ending in

nese cousins. In Filipino currency a peso is worth 50 cents; a centavo, a half a cent.

Some authorities estimate that Chinese merchants do nearly three-fourths of the retail business in the Islands, although the Japanese influence is now cutting into this figure. Manila, capital and largest city, is a modern metropolis of white buildings in a setting of palms with 350,000 people taking the daily siesta.

Spanish is spoken and English understood all over the islands, but each district has its own bastard dialect.

MARKET BARELY TAPPED

The market for refrigeration and air conditioning has barely been tapped in this country where money is plentiful and it is hot the year around—if the temperature should drop as low as 70, the natives shiver. High humidity makes the heat seem hotter.

Electricity is furnished by the Manila Electric Co. which services Manila and 102 other municipalities in Luzon, the largest and most

Are You Interested in the Philippine Market?

This is the second of a series of articles by John Strohm, a young journalist now on a trip around the world, who is interviewing refrigeration distributorships in some of the major points on his journey. His reports will thus supplement those published in Editor George Taubeneck's "Around the World" series.

In this article he describes the nature of the market in the Philippine Islands, and outlines the factors that may affect the market in the future.

1946. Then the Stars and Stripes are to be hauled down, the High Commissioner will drink one last toast and sail for home, and the Filipinos are to become masters of their own destinies.

No sooner had this law been passed than President Manuel Quezon became impatient, announced the Filipinos were better qualified to run their own set of islands, and hinted they would be better off economically if immediate independence were granted. And to the United States he went for a fireside chat or two to urge his demands.

WATCHFUL WAITING

There's an atmosphere of watchful waiting among the business men who can't quite figure out the turn of events. Both Filipino and American business leaders would like to see benevolent Uncle Sam stick around until 1946 at least. Many think Quezon is bluffing—that he doesn't really want independence. Anyway it's the one element of uncertainty towards a wonderful prosperity and opening up of the islands' vast resources.

The question: if granted independence would the Philippines be able to protect themselves against external aggression and internal disorder? And would they be able to adjust themselves to the loss of the American market for their most important product—sugar? Sugar, along with 80% of all Philippine exports (copra, coconut oil, and abaca), has preferential access to the American market. But on an equal basis, Philippine sugar would not be able to compete with Cuban (which has a preferential rate) and Javanese (which is produced more cheaply) sugar.

LIVING STANDARDS

For a dollar in China the writer got a bed, three meals, a haircut, shave, massage, and a three mile rickshaw ride—and had 50 cents left. But not in the Philippines where the American flag has raised prices to U. S. levels. The Filipinos live way beyond their Chinese and Japa-

progressive island (of course, they still have head hunters 150 miles from Manila). The rates are complicated, so complicated that no two refrigeration men could agree as to whether they were reasonable or not. Residential rates are based upon the area of the house.

For a house of less than 40 sq. meters, the first 6 kilowatts cost 25 centavos each; the next 12, 10 centavos; and the rest 5 centavos.

There are about 10,000 household refrigerators in use in greater Manila with Frigidaire getting the biggest share of the business, followed by General Electric and Westinghouse.

Air conditioning has made great strides in the past two years. All seven of the big theaters, many offices, apartment buildings, hotels, and private homes have installed air-conditioning equipment, and additional installations are being contracted for daily.

UTILITY OPERATIONS

The Manila Electric Co. claims to have the largest air-conditioned room in the world—17,887 square feet of floor space in one huge office where 200 employees have desks. It is Carrier equipment with three 30-hp. compressors to do the cooling.

Mr. Gilliland, manager of Manila Electric, believes Manila is one of the most saturated cities in the world in electric wiring. However, 30,000 homes each pay only 55 cents a month for one 25 watt lamp.

Business is excellent, he asserts, the Philippines never really feeling the depression at all. The use of electric appliances is steadily on the increase. In 1928 there were 35 electric ranges in use; today there are 1,400.

"And what do you think of Philippine independence, Mr. Gilliland?" I asked.

"I don't think; I'm in the utility business," was his answer.

MANILA DEPT. STORE

"There's a dream market for air conditioning in Manila—residences, offices, and hotels. But the Filipinos are not capable of operating ma-

chinery. They freeze people to death in the offices by getting them too cold, and as long as they see wheels going around they think the machinery must be working O.K.!"

So says W. F. Jackson—he's in his early twenties and thinking of getting married—who is department manager of air conditioning and refrigeration for Heacock's, Manila's largest department store. We walked outside of the building so he could get this condemnation off his chest and still not interfere with his Filipino workmen.

"But business is swell," he added, as we re-entered his office. Heacock's is getting many orders for both office and residence installations of Frigidaire equipment. He believes the best field now is the residences, with the portable units getting a big play.

The sale of Frigidaires is steadily on the increase; they're moving about 25 new ones a month in addition to those which they rebuild and sell. Educating the Filipinos to the use of the refrigerator is not the question—it's whether or not they have the money that determines the sale.

He told of visiting one nepa hut—huts whose roofs and sides are thatched with palm leaves—whose interior was naked of furniture. Yet in the corner was a big electric refrigerator—with nothing in it.

"Mrs. Castellano probably saw that Mrs. Palilico had one, so Mrs. Castellano decided she had to have one too," he suggested.

The only result advertising brings is the bill for the advertising, he declared. It's the idea of hearing about the possessions of others, a

(Concluded on Page 23, Column 3)

THE BUYER'S GUIDE



Model No. 500-A

"CHIEFTAIN" QUALITY-BUILT COMPRESSORS and CONDENSING UNITS

All bearings diamond bored. Positive lubrication of parts by newly developed process plus forced feed lubrication in all models.

Sizes 1/6, 1/5, 1/4, 1/3 h.p. Write for prices

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REFRIGERATION

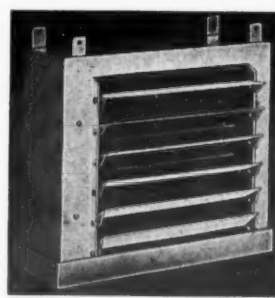
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Steel or Copper

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REMPE



Dayton V-Belts are the logical choice for all types of appliances, because they provide silent, dependable transmission—because their powerful grip prevents slippage—because they run smoothly without weaving, twisting or vibrating. A nearby distributor carries a complete stock.

THE DAYTON RUBBER MANUFACTURING CO.
DAYTON, OHIO
WORLD'S LARGEST MANUFACTURER OF V-BELTS

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PERFECTION IS BORN OF EXPERIENCE

And experience is built into every Peerless product in liberal quantities. On that blue print that Jack Rasmussen is holding lies the accumulated knowledge of twenty-five years' service to the problems of refrigeration.

Here we caught Jack, who is Chief Engineer of Peerless' New York Factory, making a final check up before shipment of a Peerless Product Cooler to be used in conditioning hops in a large eastern brewery.

Whether your problem is large or small, conditioning hops or cooling a service cabinet, Peerless' knowledge of design and methods of manufacture are your most valuable allies for successful installations. Make use of them.

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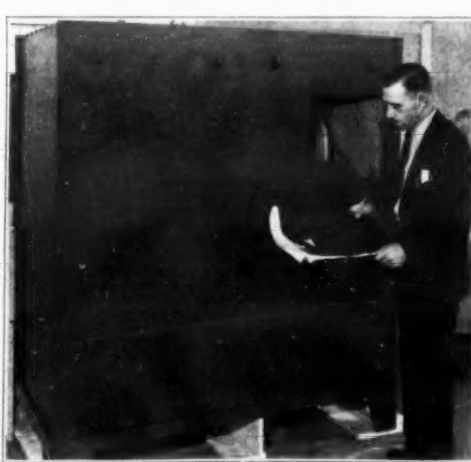
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Pacific Coast Factory

3000 S. Main Street

Los Angeles

PEERLESS JOBBERS IN ALL PRINCIPAL CITIES



BUY PEERLESS FOR PERFORMANCE

Air Conditioning Made Easy—By F. O. Jordan

Practical Application of Heat Load Calculations

SECTION NO. 20

Field Engineering

Part 1—General Discussion Of Loads and Estimates

When selecting air-conditioning equipment it is quite necessary that the actual maximum simultaneous load be known, as this is the greatest load which the equipment will be called upon to carry.

If, in computing the load, loads are assumed which do not exist, or if the magnitudes of existing loads are assumed to be greater than they are actually, or if the computed load is a summation of loads which do not occur at the same time, then the equipment selected upon the basis of the computed load will be over-sized.

The usual result will be that a competitor will make the sale. Even

if the sale should be made in the face of lower competitive prices, the result will be unfortunate, as over-sized equipment is more difficult to control, and with its use, proper comfort conditions are less easily maintained.

In general, over-design is the mark of the novice. For the novice, having no background of his own, follows meticulously the entire routine laid down by his handbook, figures all possible loads, and adds them all together.

On the other hand, if loads are omitted which really do exist, the result may be worse. For such omissions tend to result in undersized equipment, which often will be unable to maintain comfort.

In the past, the ability to estimate the load accurately usually has been born of long experience. Only experience could advise the estimator when he safely might omit a particular type of load from his summation, or

when it must be included.

Since such experience must be expensive both in good sales lost and bad sales made, and since the growth of the industry is such that the number of experienced estimators must quickly be augmented if such

growth is to continue, it is our purpose to assist the beginner to become an experienced estimator via the experience of others.

The methods of estimating loads discussed in this section are, not necessarily recommended for use in their entirety at all times, as simplified methods of the type described in subsequent sections have proven satisfactory for many types of work.

However, a thorough study of the more lengthy method described here will be of assistance in understanding all problems of air-conditioning field engineering.

The Summer Cooling Load

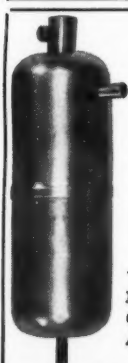
The summer comfort air-conditioning load is composed of the sensible (Continued on Page 19, Column 1)

Table 11—Transmission, Sun Effect & Lag

Part No. 1—Exterior Walls

Description of Construction	Construction No.	Trans. Coefficient only (B.t.u./Sq. Ft./1° F./Hr.)	Sun Plus Trans. Coefficient (B.t.u./Sq. Ft./1° F./Hr.)	Lag (Hours)
9" Brick				
Plaster	1	.46	.92	5½
½" Furring & plaster	2	.30	.60	5½
½" to ¾" Furring & aluminum foil or rigid insulation & plaster	3	.22	.44	5½
2" Furring & ½" flexible insulation & plaster	4	.20	.40	5½
1½" Cork or 2" furring & rock wool & plaster	5	.14	.28	5½
13" Brick				
Plaster	6	.34	.68	10
½" Furring & plaster	7	.24	.48	10½
½" to ¾" Furring & aluminum foil or rigid insulation & plaster	8	.19	.38	10½
2" Furring & ½" flexible insulation & plaster	9	.17	.34	10½
1½" Cork or 2" furring & rock wool & plaster	10	.11	.22	10½
17" Brick				
Plaster	11	.27	.54	12½
½" Furring & plaster	12	.20	.40	12½
½" to ¾" Furring & aluminum foil or rigid insulation & plaster	13	.17	.34	12½
2" Furring & ½" flexible insulation & plaster	14	.15	.30	12½
1½" Cork or 2" furring & rock wool & plaster	15	.10	.20	12½
4" Brick Veneer & one of the following: 6" to 10" Tile, 6" to 10" Cinder Blocks, 10" to 12" Concrete Blocks				
Plaster	51	.34	.68	5
½" Furring & plaster	52	.24	.48	5½
½" to ¾" Furring & aluminum foil or rigid insulation & plaster	53	.19	.38	5½
2" Furring & ½" flexible insulation & plaster	54	.17	.34	5½
1½" Cork or 2" furring & rock wool & plaster	55	.12	.24	5½
4" Brick Veneer on 1" Wood or ½" Rigid Insulation Sheeting & Building Paper & 4" Studding				
Plaster on lath or plasterboard	71	.27	.54	2½
Plaster or building board on ½" rigid insulation, or plaster & aluminum foil	72	.19	.38	2½
Plaster on 1" rigid insulation	73	.15	.30	2½
Lath, plaster & ½" flexible insulation	74	.18	.36	2½
Lath, plaster, rock wool between studding	75	.06	.12	2½
Wood Shingles or Siding on 1" Wood or ½" Rigid Insulation & Building Paper & 4" Studding				
Plaster on lath or plasterboard	81	.24	.48	1½
Plaster or building board on ½" rigid insulation, or plaster & aluminum foil	82	.18	.36	1½
Plaster on 1" rigid insulation	83	.14	.28	1½
Lath, plaster & ½" flexible insulation	84	.17	.34	1½
Lath, plaster, rock wool between studding	85	.06	.12	1½

THE BUYER'S GUIDE



RECEIVER TANKS—COMPRESSOR BASES—MOTOR MOUNTING BASES—AND OTHER STAMPINGS AND ASSEMBLIES FOR REFRIGERATION AND AIR CONDITIONING.

Our Receiver Tanks are made with drawn shells. Assembly by Hydrogen Brazing produces tanks chemically clean and free from dirt. Can furnish tanks painted if desired.

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THE new Imperial steel dehydrator is designed for refrigeration and air conditioning work. It has a steel shell with bolted flanged end. The shell is 4 inches in diameter and is furnished in 18, 24 and 36 inch lengths. Ends have 1½ inch female iron pipe thread and screens and steel wool are included.

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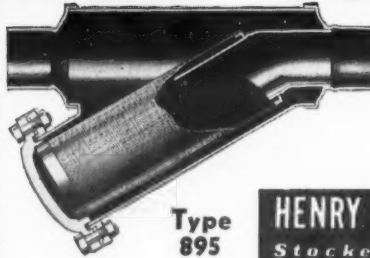
Other dehydrators have been added to the Imperial line, including a refillable cartridge type, another with dispersion tube and a very small, inexpensive size for permanent installation on small systems. Write for the new Imperial refrigeration catalog.

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VALVES • FITTINGS • TOOLS • CHARGING LINES • STRAINERS • FLOATS

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Exceptional design. Made of brass. Negligible pressure drop. Easily removable screen. Very large screen area. Light weight. Trapping of oil can be entirely prevented by installing strainer on its side or in a vertical position. Write for Catalog 62: Dryers, Strainers, Valves and Service Tools.

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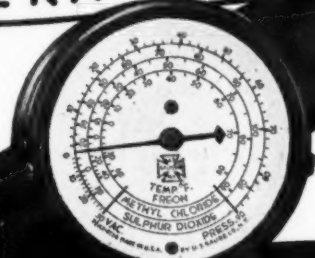
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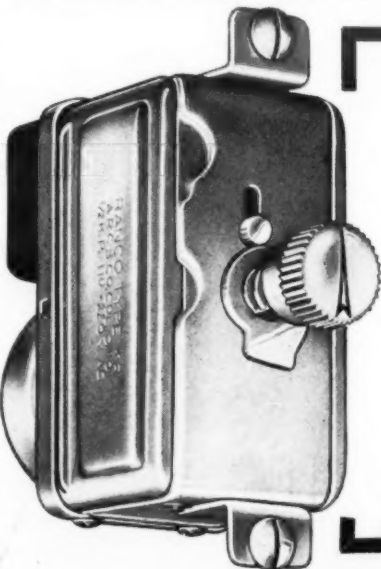
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REPLACING a refrigerator thermostat with a Ranco EXACT REPLACEMENT is almost as easy as slipping a new blade in your safety razor. Stainless Steel—no breakage! Overload coil permanently protected. No fussing. No bother. No wasted time.

Write for Bulletin showing complete line of Ranco Replacements.

RANCO, Inc., Columbus, Ohio

Factors Affecting the Summer Cooling Load; Transmission & Sun Load

(Continued from Page 18, Column 5)
(or cooling) load and the latent (or dehumidifying) load. These two main load divisions each are made up of several loads as shown by the following tabulation.

The first main division is the *Sensible Load* which is made up of the following sensible loads.

- (a) Transmission and sun load.
- (b) Sensible heat of outside air admitted into conditioned space.
- (c) Sensible heat given off by occupants.
- (d) Miscellaneous heat given off by equipment, lighting, etc.

The second main division is the *Latent Load*. The latent load is made up of the following latent loads:

- (a) Moisture contained in outside air admitted into conditioned space.
- (b) Moisture given off by occupants.
- (c) Moisture given off by equipment, etc.

Each of these load divisions will now be discussed separately.

TRANSMISSION AND SUN LOAD

Transmission and sun load are so closely related that it is difficult even to discuss them separately.

Transmission load is ordinarily taken as the heat which enters the conditioned space through the enclosing structure because of the temperature differential between the air outside the enclosing structure and the air within the conditioned space.

Sun load is ordinarily taken as the heat which enters the conditioned space because of the direct impinge-

ment of the sun's rays upon the structure enclosing the conditioned space. In the case of unprotected windows, part of the sun's heat is reflected outside while a portion is absorbed by the glass, but most of the heat of the sun's rays comes through practically unrestrained.

In the case of non-transparent structures, a portion of the energy of the rays is reflected back into the outside air, the proportion which is reflected being dependent upon the angle of incidence of the rays and upon the color and character of the surface itself.

With bright or light colored surfaces, a greater proportion is reflected than with dark surfaces. The remainder of the energy of the rays is expended in heating up the surface of the structure, generally to a temperature higher than that of the outside air, so that a portion of the heat of the sun finds its way by transmission into the relatively cooler conditioned space, while another portion is radiated back from the heated surface of the structure into the relatively cooler outside air.

Because a portion of the heat which is absorbed is radiated back to the exterior, it is incorrect to use the temperature differential between the outside surface of the structure and the inside air as a basis for computing sun load, because the resulting computed load would be much too high. Lack of information regarding the actual amount of sun load has given rise to many rule of thumb methods

of computation which are at best unsatisfactory, and under many conditions considerably in error.

Another point which is the basis of considerable conjecture is the "lag," or the time required for the passage of the sun's heat through building construction.

Some accurate mathematical method of determining both the actual amount of sun load and the time of its arrival within the conditioned space is very much to be desired, because the sun load upon many projects constitutes the major portion of the load, and because the time of the sun load's arrival within the conditioned space must be known in order to determine the maximum simultaneous load.

For this reason, a careful study has been made of actual data obtained from extensive tests performed upon common building materials in which the intensity and lag of sun load were carefully measured under various atmospheric conditions and at various angles of incidence.

From this study, factors have been derived for various materials, the use of which result in computed sun loads which check with the sun loads obtained by actual test, thus eliminating the employment of assumed temperature differentials, area factors, and other forms of guesswork.

Obviously, when the surface in question is exposed to direct sunlight for any considerable period of time, a greater quantity of heat will pass into the conditioned space beyond the surface, so that an additional factor must be introduced.

Based upon tests, the following "sun factors," or approximate multipliers for determining sun plus transmission when the overall transmission

factor is known, have been derived.

Construction Material	ROOFS	"Sun Factor"
Wood	3.00	
Metal	2.50	
Tile	2.50	
Concrete	1.80	
Gypsum	3.25	
Single glass with no protection	11.00	
Single glass with inside shade	5.50	

Construction Material	WALLS	"Sun Factor"
Wood	2.40	
Brick	2.00	
Tile	2.00	
Stone	1.50	
Concrete	1.25	
Single glass—no protection	7.50	
Single glass—shade	3.50	
Single glass—awning	2.50	
Single glass—venetian blind	4.50	

These sun factors may be used as multipliers for determining sun load plus transmission load, where sun load exists.

"Lags" for various materials are about as follows:

Construction Material	Lag In Hours
Glass	0
2" Masonry	1 1/2 hr. to 1 hr.
4" Masonry	1 1/2 hr. to 2 1/2 hr.
6" Masonry	3 1/2 hr. to 4 1/2 hr.
9" Masonry	5 hr. to 6 hr.
13" Masonry	9 hr. to 11 hr.
17" Masonry	12 hr. to 14 hr.
Brick Veneer	2 1/2 hr.
1" Wood	3/4 hr.
1 1/2" Wood	1 hr.
2" Wood	1 1/2 hr.
4" Wood	5 1/2 hr.
Standard Frame Wall	1 1/2 hr.

(Continued on Page 20, Column 1)

THE BUYER'S GUIDE

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The most complete line of Refrigeration Equipment—New Streamlined Beauty—Unchallenged quality. Exclusive Territories Now Available—Complete Financing Plan.

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Retardo... Baker's Box

Every progressive Baker should own a Retardo—it is new, different, and produces genuine RESULTS. For you, Retardo represents another SHERER money-maker with splendid sales and profit possibilities... a new field for compressor sales.

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1937 line offers wide variety and sensational values. 6 big new features and iron-clad guarantee. Only Tyler gives one-piece "welded steel" construction, 100% insulation. Wonderful sales opportunity. Most talked of and fastest selling line on market. WRITE today.

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Table 11—Transmission, Sun Effect & Lag (Cont.)

Description of Construction	Construction No.	Transmission Coefficient Only (B.t.u. per square foot per 1° temperature difference per hour)		Lag (Hours)
		Trans. Coefficient	Sun Plus Trans. Coefficient (B.t.u./Sq. Ft./1° TD/Hr.)	
Pitched Roofs				
Wood Shingles on Wood Strips with				
Rafters exposed	301	.46	1.38	1 1/2
Plasterboard or lath & plaster	302	.30	.90	1
1/2" Rigid insulation	303	.22	.66	1
1" Rigid insulation	304	.16	.48	1 1/2
1 1/2" Corkboard insulation	305	.12	.36	1 3/4
2" Corkboard insulation	306	.10	.30	2
1/4" Flexible insulation	307	.17	.51	1
1" Flexible insulation	308	.13	.39	1 1/4
Aluminum foil	309	.22	.66	3/4
3/8" Rock wool fill	310	.06	.18	2

One of the following on Wood Sheeting & Rafters & Asphalt Shingles, Asbestos Shingles, Composition Roofing, Slate Roof, Tile Roof, with				
Rafters exposed	311	.56	1.68	1 1/2
Plasterboard or lath & plaster	312	.33	1.00	1
1/2" Rigid insulation	313	.24	.72	1
1" Rigid insulation	314	.17	.51	1 1/2
1 1/2" Corkboard insulation	315	.13	.40	1 3/4
2" Corkboard insulation	316	.11	.33	2
1/4" Flexible insulation	317	.18	.54	1
1" Flexible insulation	318	.13	.40	1 1/4
Aluminum foil	319	.24	.72	3/4
3/8" Rock wool fill	320	.065	.20	2

Part No. 2—Glass

(Transmission and Sun Effect)	Construction No.	Sun Plus Trans. Coefficient (B.t.u./Sq. Ft./1° TD/Hr.)	
		Trans. Coefficient only (B.t.u./Sq. Ft./1° TD/Hr.)	Sun Plus Trans. Coefficient
Single Glass			
Window with no protection	351	1.1	8.0
Window with awning or marquee	352	1.1	2.5
Window with inside shade	353	1.0	3.5
Window with inside venetian blind	354	1.0	4.5
Window with outside venetian blind	355	1.0	2.0
Show window with thin wood or glass enclosing show space behind & with awning or marquee	356	.8	1.5
Skylight with no protection	357	1.1	12.0
Skylight with inside shade	358	1.0	5.5
Double Glass			
Window with no protection	359	.5	7.5
Window with awning or marquee	360	.5	2.3
Window with inside shade	361	.5	3.3
Window with inside venetian blind	362	.5	4.3
Window with outside venetian blind	363	.5	2.0
Show window with thin wood or glass enclosing show space behind & with awning or marquee	364	.4	1.5
Skylight with no protection	365	.5	11.5
Skylight with inside shade	366	.5	5.3

STURDY CONSTRUCTION
HEAVY DUTY Refrigerators

This beautiful line of Modern Heavy Duty Refrigerators was developed for use where the service is hard, and where a large amount of storage space is required.

Sectionally built. Meat racks may be substituted for shelves if desired. Easily cleaned—their sanitary and hygienic value, appeals to hospitals, hotels and school lunchrooms.

Also available with Golden Oak exterior, if desired.

Sold thru Distributors only. Write for Folder 7300.

SPECIAL DESIGNS BUILT TO ORDER

GLOEKLER Manufacturing Company
ERIE, PENNSYLVANIA
SALES OFFICE: 428 FORTH AVE., PITTSBURGH, PA.

MANUFACTURERS OF ALL TYPES OF COMMERCIAL REFRIGERATORS AND CASES

Use of Tables for Transmission, Sun Effect and Lag

(Continued from Page 19, Column 5)

As mentioned above, the "lag" in time required for the passage of the sun's rays through a construction material is important as well as the quantity of sun's heat which is passed, because it is necessary to know when sun effect will arrive within the conditioned space so that we will know which loads must be added to it, provided that internal loads of a periodic nature exist also. For example, if the effect of the sun does

not reach the conditioned interior of a restaurant until after the occupants leave, there is no reason to add sun load to occupancy load.

Empirical formulas and curves have also been developed by which the amount and effect of "lag" may readily be determined.

For the sake of simplicity and ease of application, the effects of the above study have been included in the rules which are given below and in the table for transmission, sun

effect and lag, Table 11.

In computing transmission and sun effect, select the proper coefficient from the transmission, sun effect and lag table. Multiply this coefficient by the area of the surface under consideration and multiply the resultant product by the temperature differential between the space beyond this surface and the space to be conditioned. The result will be the load due to transmission or combined transmission and sun effect through this particular surface which should be used in summing the entire sensible load.

It will be noted that there are five columns given in the transmission, sun effect, and lag tables which are as follows:

Column No. 1.—Shows the construction number to facilitate reference.

Column No. 2.—Designates the construction.

Column No. 3.—Shows the transmission coefficient, which is to be used when no sun load is to be considered.

Column No. 4.—Shows the combined sun load and transmission coefficient to be used when sun load is to be considered.

(As described above, the factor used in obtaining this coefficient has been derived from test data and its use will closely approximate the results obtained in those tests. Since the sun effect actually increases the temperature differential rather than the coefficient, it would be literally proper to apply the factor to the temperature differential. However, for the sake of simplicity and ease of application, the factor has been applied instead to the coefficient, the actual result, of course, being the same.)

Column No. 5.—Shows the lag in hours which will be required for a peak sun load to pass entirely through the structure.

The following rules may be used to advantage in computing transmission and sun effect:

1. For surfaces whose exposure to direct sunlight is less than one-half lag, use the transmission coefficient only. The reason for this is because a partial reversal of heat-flow from the material takes place as soon as the period of sun exposure is past. If the period of exposure is less than one half of lag-time, very little or no sun load reaches the conditioned space.

2. For surfaces whose exposure is approximately equal to or greater than the lag, use the full sun effect unless otherwise directed below. For surfaces whose exposure is only slightly greater than one-half the lag, the judgment of the engineer must be exercised.

3. Peak sun effect is imposed upon the outside of the structure at the following times of the day:

Surface	Time of Day
Roof	12:00 noon
East wall	8:00 a.m.
West wall	4:00 p.m.
South wall	12:00 noon

4. For restaurants or similar projects whose peak internal load period (occupancy plus appliance) misses the time of peak inside sun effect for any given surface by a time differential of greater than three quarters of the lag of that surface, transmission load only need be used for this surface, except in cases where the sun load is greater than the sensible occupancy load, when the combined transmission and sun load coefficient should be used and the sensible occupancy omitted.

When the time differential is less than one-half lag, the entire sun load should be used. Judgment must be exercised when the time differential is between $\frac{1}{2}$ and $\frac{3}{4}$ of lag.

The above resolves itself into these rules for average construction:

(a) On restaurants whose peak oc-

cupancy occurs only during the noon hour, use the combined sun and transmission coefficient for the east wall only. Use transmission coefficient only for other surfaces.

(b) On restaurants whose peak occupancy occurs between 5 and 7 p.m., use the combined sun and transmission coefficient for the roof, or for the west wall (whichever is the larger). Use the transmission coefficient only for other surfaces.

(c) On restaurants whose peak occupancy occurs during the noon hour, and also between 5 and 7 p.m., add combined transmission and sun load of east wall to noon sensible occupancy and add combined transmission and sun load of roof or west wall (whichever is the larger) to the evening sensible occupancy. Select equipment on the basis of the larger of the two sums. Use the transmission factor only except for the one surface of maximum sun load.

(d) On restaurants whose peak occupancy occurs less than two hours after sundown, use the combined transmission and sun effect factor for the west wall. Use the transmission coefficient only for other surfaces, unless the project falls under one of other categories listed above.

5. On projects of heavy occupancy (more than one person per twenty-five square feet of floor area) whose heavy occupancy peaks are not of greater duration than two hours, do not figure transmission gain through any interior masonry walls or floors more than 4 inches thick, unless some special source of heat exists within the space beyond such structure.

6. Do not figure transmission gain through the floor of first story spaces, unless,

(a) There is some heavy heat-producing equipment which is operated in the summer within the space below the floor.

(b) There is a heavy outside air change in the space below the floor.

7. Unless otherwise required by one of the foregoing rules, sun effect need be included only for the surface upon which it is greatest, unless this surface is the roof. In this event, sun effect must be included for the roof and also for the windows only in the one wall having the greatest window area (except that north windows must not be used). The reason for this general rule is that the rays of the sun can be perpendicular to (hence maximum upon) only one surface at the same time.

8. Do not use sun effect for a surface if the occupancy period (for offices, etc.), ends at a time of day which is less than one-half the "lag" time for the type of construction used in the surface, after the time of peak sun effect upon the outside of the surface.

While an agreement exists throughout the industry on the above described method of computing transmission load, various methods of estimating sun effect are in use, most of which are based upon arbitrary assumptions as to the increase in effective temperature differential between outside and inside. With such methods, sun effect plus transmission is computed as described above for transmission load except that a greater temperature differential is used when sun effect is to be included, than when only transmission load is to be determined.

Expressed as simple equation, the equation for computing transmission load is

$$T = T_d \times S \times K$$

where

T=Transmission load in B.t.u. per hour.

T_d=Outside temperature minus inside temperature.

S=Exposed surface of construction in square feet.

K=Transmission coefficient in B.t.u. per hour per square foot of exposed surface per degree temperature difference Fahrenheit as taken from Table 11.

When computing sun effect plus transmission by assuming a greater temperature difference, the equation is the same, a greater temperature difference being assumed.

The A.S.H.V.E. Guide recommends increasing temperatures by the following quantities to allow for sun load:

Surface	Black	Brick or Tile	Aluminum Paint
Roof	45°	30°	15°
East or West Wall	30°	20°	10°
South Wall	15°	10°	5°

Thus, if the temperature difference between outside and inside is 15°, a temperature differential of 35° (20° plus 15°) would be used in computing sunload for an east or west brick wall.

Note that a lower factor is given for the south wall because the sun's rays always strike at an angle. However, it must be remembered that sunlight strikes the south wall for a longer period so this differentiation is a doubtful one for practical use.

When computing sun effect plus transmission by use of the sun factors given above, the equation is

$$T = T_d \times S \times K \times F$$

where F is the sun factor, and other symbols are as listed above.

The proper temperature differential between the outside of the building and the inside of the air-conditioned space varies with the climate and with the usage, particularly as to the length of average occupancy, or to the duration of time that the average occupant remains within the building.

For hotter climates, design should be based upon a greater differential, while for the room where the occupants remain for more than an hour, greater temperature differentials generally are desirable than is the case where the average occupant remains for 15 minutes or less.

Various guides and handbooks list recommended outside design conditions for various localities as well as recommended inside design temperatures at various outside conditions.

However, a simple and generally satisfactory practice is to base design upon a temperature differential between outside and inside of 15° F. for the high class installation where average occupancy exceeds one hour, and of 10° for the cheaper installation where the average occupants remain for less than one-half hour.

When 15° is adopted as the design differential between outside and inside the building, 12° may be assumed to be the differential between an adjacent unconditioned room on the top floor and the conditioned room, or 8° if the unconditioned adjacent room is not on a top floor. If 10° is the outside differential used, the differential between the adjacent top floor unconditioned room and the conditioned space may be taken as 8°, or 6° if the adjacent unconditioned room is not on a top floor.

Therefore the following relationships generally are acceptable.

Where average occupancy is more than one hour, assume the following—
Outside temperature 15° hotter than conditioned room.

Adjacent unconditioned top floor room 12° hotter than conditioned room.

Adjacent unconditioned room not on top floor 8° hotter than conditioned room.

Where average occupancy is less than one-half hour, assume the following—

Outside 10° hotter than conditioned room.

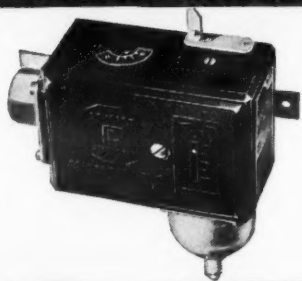
Adjacent unconditioned top floor room 8° hotter than conditioned room.

Adjacent unconditioned room not on top floor 8° hotter than conditioned room.

(Continued on Page 21, Column 4)

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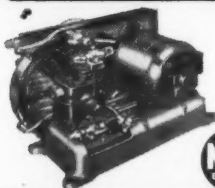
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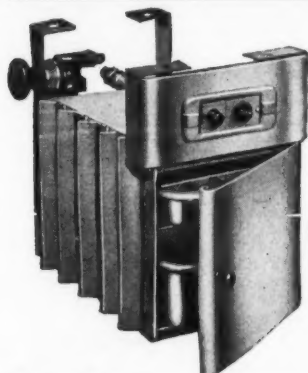
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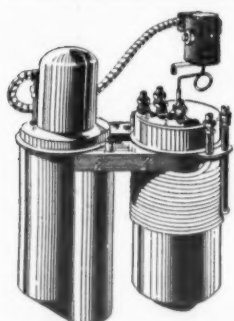
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Table No. 12—Transmission Coefficients for Interior Construction

COEFFICIENTS OF TRANSMISSION (U) OF FRAME CONSTRUCTION FLOORS AND CEILINGS

Coefficients are expressed in B.t.u. per hour per square foot per degree Fahrenheit difference between the air on the two sides, and are based on still air (no wind) conditions on both sides.

Type of Ceiling	Insulation Between Joists	No.	A	B	C	D	E
No Ceiling	None	401	0.69	0.46	0.27	0.34	0.34
Metal Lath and Plaster (3/4")	None	402	0.69	0.30	0.21	0.25	0.25
Wood Lath and Plaster	None	403	0.62	0.28	0.20	0.24	0.24
Plaster Board (3/4") and Plaster (1/2")	None	404	0.61	0.28	0.20	0.24	0.23
Rigid Insulation (1/2") and Plaster (1/2")	None	405	0.35	0.21	0.16	0.18	0.18
Metal Lath and Plaster	Flexible Insula. (1/2")	406	0.24	0.16	0.13	0.15	0.15
Metal Lath and Plaster	Rigid Insulation (1/2")	407	0.26	0.17	0.14	0.15	0.15
Metal Lath and Plaster	Bright Aluminum Foil	408	0.59	0.22	0.16	0.19	0.19
Metal Lath and Plaster	Rock Wool Fill (3/4")	409	0.067	0.063	0.058	0.060	0.060
Corkboard (1 1/2") and Plaster (1/2")	None	410	0.16	0.12	0.10	0.11	0.11
Corkboard (2") and Plaster (1/2")	None	411	0.12	0.10	0.087	0.094	0.094

A—No flooring.
 B—Yellow pine flooring on joists.
 C—Yellow pine flooring on rigid insulation (1/2") on joists.
 D—Maple or oak flooring on yellow pine sub-flooring on joists.
 E—1/4" battleship linoleum on yellow pine flooring.

COEFFICIENTS OF TRANSMISSION (U) OF CONCRETE CONSTRUCTION FLOORS AND CEILINGS

Coefficients are expressed in B.t.u. per hour per square foot per degree Fahrenheit difference in temperature between the air on the two sides, and are based on still air (no wind) conditions on both sides.

Type of Ceiling	Thickness of Concrete (Inches)	No.	A	B	C	D	E
No ceiling	4	501	0.65	0.40	0.31	0.61	0.44
	6	502	0.59	0.37	0.30	0.56	0.41
	8	503	0.53	0.35	0.28	0.51	0.38
	10	504	0.49	0.33	0.27	0.47	0.36
1/2" Plaster Applied Directly to Under Side of Concrete	4	505	0.59	0.38	0.30	0.56	0.41
	6	506	0.54	0.35	0.28	0.52	0.38
	8	507	0.50	0.33	0.27	0.47	0.36
	10	508	0.45	0.32	0.26	0.44	0.34
Suspended or Furred Metal Lath and Plaster (3/4") ceiling	4	509	0.37	0.28	0.23	0.36	0.29
	6	510	0.35	0.26	0.22	0.34	0.28
	8	511	0.33	0.25	0.21	0.32	0.27
	10	512	0.32	0.24	0.21	0.31	0.25
Suspended or Furred Ceiling of Plaster Board (3/4") and Plaster (1/2")	4	513	0.35	0.26	0.22	0.34	0.28
	6	514	0.33	0.25	0.21	0.32	0.26
	8	515	0.31	0.24	0.21	0.30	0.25
	10	516	0.30	0.23	0.20	0.29	0.24
Suspended or Furred Ceiling of Rigid Insulation (1/2") and Plaster (1/2")	4	517	0.24	0.20	0.17	0.24	0.21
	6	518	0.23	0.19	0.17	0.23	0.20
	8	519	0.22	0.18	0.16	0.22	0.19
	10	520	0.22	0.18	0.16	0.21	0.19
Plaster (1/2") on Corkboard (1 1/2") Set in Cement Mortar (1/2") on Concrete	4	521	0.15	0.13	0.12	0.14	0.14
	6	522	0.14	0.13	0.12	0.14	0.13
	8	523	0.14	0.12	0.11	0.14	0.13
	10	524	0.14	0.12	0.11	0.14	0.13

A—No flooring (concrete bare).
 B—Yellow pine flooring on wood sleepers embedded in concrete.
 C—Maple or oak flooring on yellow pine sub-flooring on wood sleepers embedded in concrete.
 D—Tile or terrazzo flooring on concrete.
 E—1/4" battleship linoleum directly on concrete.

COEFFICIENTS OF TRANSMISSION (U) OF CONCRETE FLOOR ON GROUND WITH VARIOUS TYPES OF FINISH FLOORING

Coefficients are expressed in B.t.u. per hour per square foot per degree Fahrenheit difference in temperature between the ground and the air over the floor, and are based on still air (no wind) conditions.

Type and Thickness of Insulation	Thickness of Concrete (Inches)	No.	A	B	C	D	E
None	4	601	1.07	0.35	0.28	0.98	0.60
	6	602	0.90	0.33	0.27	0.84	0.54
	8	603	0.79	0.32	0.26	0.74	0.50
	10	604	0.70	0.30	0.25	0.66	0.46
None§	4	605	0.66	0.29	0.24	0.63	0.44
	8	606	0.54	0.27	0.23	0.52	0.39
1" Rigid Insulation§	4	607	0.22	0.16	0.14	0.22	0.19
1" Rigid Insulation§	8	608	0.21	0.15	0.13	0.20	0.18
2" Corkboard§	4	609	0.12	0.099	0.093	0.12	0.11
2" Corkboard§	8	610	0.12	0.096	0.090	0.12	0.11

A—No flooring (concrete bare).
 B—Yellow pine* flooring on wood sleepers resting on concrete.
 C—Maple or oak† on yellow pine sub-flooring on wood sleepers resting on concrete.
 D—Tile or terrazzo‡ on concrete.
 E—1/4" battleship linoleum directly on concrete.
 §—Assumed 25/32 in. thick. †—Assumed 13/16 in. thick. ‡—Assumed 1 in. thick. §—Include 3-in. cinder concrete placed on the ground. The insulation is applied between the cinder concrete and the stone concrete. Usually the insulation is protected on both sides by a water proof membrane, but this is not considered in the calculations.

COEFFICIENTS OF TRANSMISSION FOR FRAME INTERIOR WALLS AND PARTITIONS

Coefficients are expressed in B.t.u. per hour per square foot per degree Fahrenheit difference in temperature between the air on the two sides, and are based on still air (no wind) conditions on both sides.

Type of Wall	Wall No.	A	B	C	D	E	F
Wood Lath and Plaster On Studding	753	0.62	0.34	0.11	0.065	0.21	0.24
Metal Lath and Plaster On Studding	754	0.69	0.39	0.11	0.066	0.23	0.26
Plaster Board (3/4") and Plaster On Studding	755	0.61	0.34	0.10	0.065	0.21	0.24
1/2" Rigid Insulation and Plaster On Studding	756	0.35	0.18	0.083	0.056	0.14	0.15
1" Rigid Insulation and Plaster On Studding	757	0.23	0.12	0.066	0.048	0.097	0.10
1 1/2" Corkboard and Plaster On Studding	758	0.16	0.081	0.062	0.040	0.070	0.073
2" Corkboard and Plaster On Studding	759	0.12	0.063	0.045	0.035	0.057	0.059

A—Single partition (finish on one side of studding).
 B—Air space between studding.
 C—Flaked Gypsum fill between studding.
 D—Rock Wool fill between studding.
 E—1/2" flexible insulation between studding (one air space).
 F—Stud space faced on one side with bright aluminum foil.

COEFFICIENTS OF TRANSMISSION FOR MASONRY PARTITIONS

Type of Wall	No.	Plain Walls (No Plaster)	Walls Plastered On One Side	Walls Plastered On Both Sides
4" Hollow Clay Tile	760	0.45	0.42	0.40
4" Common Brick	761	0.50	0.46	0.43
4" Hollow Gypsum Tile	762	0.30	0.28	0.27
2" Solid Plaster	763	0.30	0.28	0.27

Design Conditions & Best Temperature Differentials

(Continued from Page 20, Column 5)
on top floor, 6° hotter than conditioned room.

Transmission loads may be based upon the above differentials or they may be based upon the outside and inside design conditions recommended by usage in the given locality. Sun loads may be based upon the above differentials, either increased by the addition of the differentials listed above, or multiplied by the factors given above as "sun factors," or they may be taken directly from Table No. 11.

Example — Determine transmission load for east plastered 9-inch brick wall of 100 sq. ft. area with temperature differential of 15°, if sheltered from sun.

$T = T_d \times S \times K$
 $T_d = 15^\circ$

$S = 100$ sq. ft.

K (from Table 3) = .46

$T = 15 \times 100 \times .46 = 690$ B.t.u./hr.

Determine sun load plus transmission using "sun factor" method, if wall is exposed to sun.

$T = 15 \times 100 \times .46 = 690$ B.t.u./hr.

Determine sun load plus transmission, using added temperature differential method.

$T = (15 \text{ plus } 20) \times 100 \times .46 = 1610$ B.t.u./hr.

Determine sun load plus transmission using Table 11.

$T = 15 \times 100 \times .92 = 1380$ B.t.u./hr.

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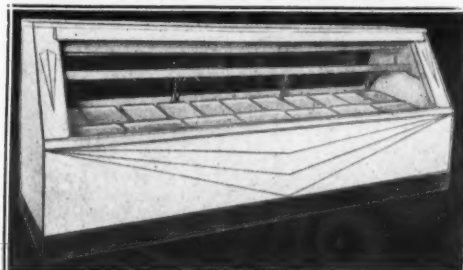
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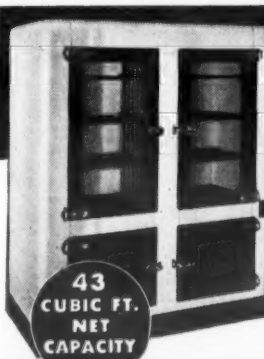
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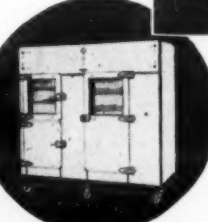
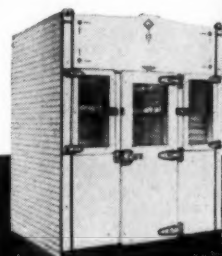
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How to Select and Install Air Conditioning Equipment

CASE NO. 25

Special Dehumidifier In Restaurant with High Latent Load

By T. H. Mabley

Frequently the air-conditioning engineer is faced with a problem involving a high latent heat cooling load in proportion to the total load.

Such a condition often occurs in commercial installations where fresh air and occupancy loads represent the largest portion of the cooling load as in theaters, restaurants, night clubs, and other such establishments. Many industrial applications present a similar problem.

These installations require considerable care in choice of equipment and layout of the system. If a high latent load is not properly handled, the engineer runs the danger of maintaining the design dry bulb temperature only with a high humidity.

Even if the dry bulb temperature is reduced below the required level, the air will feel sticky and perhaps "clammy" if the humidity is allowed to stay above say 45 or 50%.

AN INTERIOR AREA

To take an illustrative problem we have shown a night club or dining room in a hotel (Fig. 1).

The room is almost entirely an interior area. The space is located in a one-story portion of the building but with a high ceiling hung from the roof in such a manner as to provide a space between the ceiling and the roof that may be used for ductwork.

The room to be conditioned is used as a dining room during the day, but the largest load appears at night when the space is crowded to capacity by people half of whom will be dancing.

The problem therefore will be to provide the proper cooling effect to maintain a comfortable temperature and humidity as well as to provide adequate fresh air to dilute the smoky atmosphere. The heating of

the space is adequate, but we must provide a means to temper the fresh air introduced into the conditioned space.

Adequate and proper circulation will be important, because in a room with a large number of occupants, many of whom are dressed in evening clothes, the danger of drafts is comparatively serious.

Design conditions for this particular locality are 95° dry bulb and 78° wet bulb outside. In the conditioned space we will endeavor to keep a maximum of 80° dry bulb and 47% relative humidity under these maximum conditions.

AIR REQUIREMENTS

The room is normally occupied by 400 persons for over an hour's duration of time. At least half of the occupants are dancing and many are smoking. Therefore, at least 15 c.f.m. of air per person will be required for ventilation. More than this amount will be handled part of the time, but under maximum load conditions we will use a total figure of 6,000 c.f.m. of fresh air.

With this data the load for the cooling and dehumidification equipment may be determined in the usual manner. From the summary of the

Table 1—Heat Gain Calculation Summary

Sensible Heat	
Conduction	43,000 B.t.u.
Lights—4,000 watts	13,200 B.t.u.
Occupancy—400 people × 220 B.t.u.	88,000 B.t.u.
Total Internal Load	144,200 B.t.u.
Fresh Air—6,000 c.f.m. × 1.03	92,700 B.t.u.
Total Sensible Load	236,900 B.t.u.
Latent Heat	
Occupancy	
200 people at rest, 180 B.t.u.	36,000 B.t.u.
200 people dancing, 350 B.t.u.	70,000 B.t.u.
Total Internal Load	106,000 B.t.u.
Fresh Air—6,000 c.f.m. × .64 × (118—72) grains.....	176,640 B.t.u.
Total Latent Load	282,640 B.t.u.
Total Heat Gain	519,540 B.t.u.

Sensible Heat
Ratio Total Heat .456

cover the supply openings and serve as distribution deflectors. The supply opening is actually the space between two concentric circular sections.

RECIRCULATION

In the middle section exhaust or recirculated air is taken in through a grille installed in the center of

LATENT LOAD

If we consider that we can pass all the fresh air and 4,000 c.f.m. of the recirculated air through the dehumidifier we will have a total of 10,000 c.f.m. to be passed through the unit. To handle the internal latent load of 106,000 B.t.u. in this case we must reduce the 10,000 c.f.m. of air

106,000 B.t.u.

16,000 c.f.m. × .64

or 16.6 grains below the room condition. Thus with a room condition of 72 grains the air leaving the dehumidifier will have a moisture content of 72—16.6 or 55.4 grains per pound. This air will be mixed with the by-passed air and then passed through the cooling coils for sensible heat removal.

DEHUMIDIFIERS

There are different types of systems used for dehumidification purposes, but in general the equipment consists of some chemical which will absorb the moisture in the air. Various chemicals have been used, but the field is limited by certain very definite physical properties required of the substance used.

They must be non-toxic, chemically stable, easy to handle in air-conditioning equipment, and easily regenerated or dehydrated.

One of the chemicals commonly used is lithium chloride. This substance has several other desirable features in addition to those required. It has no reaction with carbon dioxide and in this connection is very valuable in serving partially as a filter to absorb dirt, dust, some tobacco smoke and odors.

This chemical is circulated through the dehumidifier unit as a liquid and thus can be readily handled.

CYCLE OF OPERATION

The cycle of operation for this unit consists first of absorption of moisture from the air in a contactor chamber. Here the air is passed through a series of contactor surfaces at a velocity of approximately 350 f.p.m.

The liquid which is passed over these surfaces is then carried to a concentrator where the moisture absorbed in the dehumidification of air is boiled off by the application of heat. The liquid is then cooled by an auxiliary heat exchanger and returned to the sump for recirculation to the contactor or dehumidifier unit located with the air conditioner.

(Concluded on Page 23, Column 1)

THE BUYER'S GUIDE

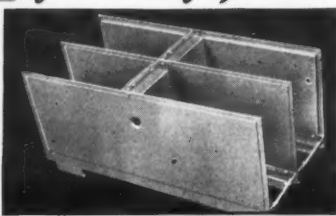
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An Excessive Humidity Problem

What equipment would you select in air conditioning a commercial establishment with a high latent to total heat load ratio, such as a restaurant or night club? In the article on this page, T. H. Mabley, chief engineer for a Detroit air-conditioning distributor, presents one answer to the problem. His solution involves the use of special dehumidifying apparatus, and an unusual diffusing system. Mr. Mabley's articles are directed at the air-conditioning distributor-contractor, and each week he presents a practical solution to some new aspect of application engineering.

calculations shown in Table 1 it may be readily observed that it would be almost impossible for the ordinary direct expansion cooling coil to give a performance to meet the ratio of sensible to total heat required. Some auxiliary equipment must be used to perform the dehumidification function.

COOLING SYSTEM

For the sensible cooling of the air we can use a direct expansion coil and a refrigeration compressor. If we are going to use some other means to handle the latent heat load we can operate the evaporator in the refrigeration cycle at a higher refrigerant temperature than normally used for the other air-conditioning systems previously discussed. This feature permits the use of a machine having less horsepower and with a lower operating cost.

The conditioning equipment will consist of a blower to handle 15,000 c.f.m., cooling coils for direct expansion operation, tempering coil to be connected to the central steam supply, and the necessary dehumidifying equipment.

AIR DISTRIBUTION

The conditioning equipment can be located on the mezzanine above the kitchen floor. With this arrangement the supply and return ducts may be brought out directly from the furred ceiling space to the conditioner. The main supply duct will be installed the full length of the conditioned room in the ceiling space.

This duct connects with five branches to the ceiling plaques which

the ceiling discharge plaque. For normal operation three of these openings are used for recirculation of air, and the remaining two vent into the ceiling space for exhaust air from the conditioned space.

This arrangement whereby the supply air is deflected laterally and then allowed to drop over the entire area while the return or exhaust air is removed from the room at the same point only in a vertically upward direction makes a very simple installation and keeps the supply or return outlets away from the occupied area.

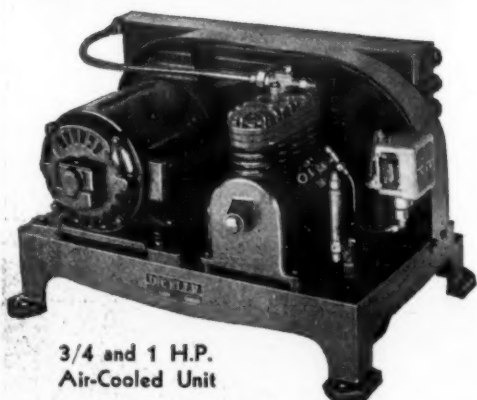
The recirculation connections will be provided with a damper so that the recirculation duct may be closed off and the opening vented to the ceiling space for 100% exhaust operation.

Two exhaust fans will be installed in penthouses on the roof. These will serve the purpose of exhausting air from the conditioned space and also will keep the temperatures from getting excessively high in the ceiling space. The fans should have the equivalent capacity of the air conditioner fan.

HUMIDITY CONTROL

Prime feature of this entire system is the method used for control of humidity. Having determined the latent heat load, equipment can be selected to handle this job. In addition to reducing the moisture content of the fresh air brought into the system the unit must reduce the moisture content of the supply air enough below the room condition to offset the internal latent heat gain.

DICELER 4 CYLINDER UNITS



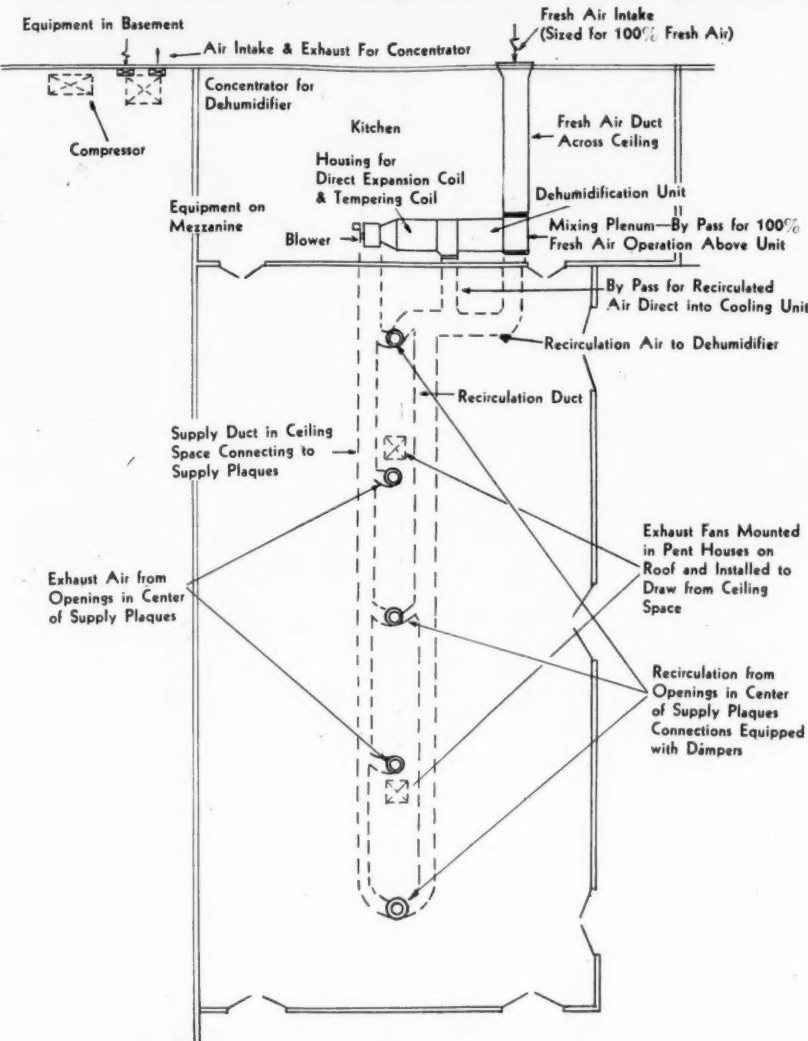
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Fig. 1—Unusual Diffusion System in Dining Room



Chemical System Used To Lessen Humidity In Dining Room Air

(Concluded from Page 22, Column 5)

With this type of system the moisture is removed from the air before it enters the cooling coils. In very exacting industrial jobs the air temperature leaving the dehumidifier may be approximately 90° dry bulb and may have a moisture content as low as 25 to 30 grains a pound.

The use of a chemical solution for drying and steam regeneration provides for tremendous flexibility of design from the standpoint of entering and leaving dewpoints as well as sources of heat for regeneration.

15-Ton Baker System Cools Kalamazoo Walgreen Store

KALAMAZOO, Mich.—A Baker air-conditioning system of 15-ton capacity has been installed in a Walgreen drug store here by Burge Ice Machine Co.'s Detroit branch.

Coils and compressor are in the basement of the store, and the cooled air is forced by a blower system through ducts to the store above.

Peterson Does Sheet Metal Work in Model Home

KENOSHA, Wis.—Martin M. Peterson is installing air-conditioning and sheet metal work in a model home under construction here by Kenosha Lumber & Coal Co.

New Houston Airtemp Dealer

HOUSTON, Tex.—G. O. Burr & Co., with headquarters in the Esperson building, has been named Chrysler Airtemp dealer here.

'Keeping Up with Jones' Lures the Filipinos to Buy Refrigerators

(Concluded from Page 17, Column 5)

little coveting, and then they buy too—sort of a Filipino version of keeping up with Jones.

He told of taking over the Johnson outboard motor sales after advertising had failed. He and the girl friend zoomed around in Manila bay in a couple of outboard motor boats until people began to inquire about them. The former agent sold 10 a year; Mr. Jackson is going to sell 150 this year.

Both Filipinos and Americans are employed as salesmen. A warehouse in the port area also is used as a big repair shop.

The youthful manager doesn't believe the Filipinos really want independence, and he thinks Quezon is bluffing.

"He was elected on an independence platform, and he must make his constituents think he's doing his darndest to get it for them."

Incidentally, President Quezon owns a couple of Frigidaires.

SERVICEMAN DAY

The fellow who runs the biggest refrigeration repair shop in the Orient, who says a young man with the stuff can make a million in Manila in the next 10 years, and who cusses the sealed unit is George Day—36 years in the Philippine Islands.

George was with Frigidaire as service manager for seven years, but now is in business for himself specializing in refrigeration repair. He buys many second hand trade-ins from dealers, breaks up about half of them and rebuilds the others.

He rents some and sells some. The rental business is good right now because of the U. S. service (military) men temporarily stationed here, and because of the talk of immedi-

ate independence.

"Why not buy a rebuilt refrigerator for 100 pesos," he asked a customer, "rather than paying 12 pesos a month rent?"

"Well, we're laying low, don't know how long we're going to be in these islands now that they're talking of immediate independence," was the customer's answer.

He estimated that although G-E, Frigidaire, and Westinghouse were out in front in total installations, Electrolux has sold most in the last five months.

"They gave easy terms, only 10 pesos down, around Christmas time; and then too, if people use gas for a hot water heater and for a range, it pays to use it for refrigeration." The price of gas is 16 centavos a cubic meter.

"Electric rates are too damned high," he declared, and told of a fight which the city council was now having with the Manila Electric Co. The city was threatening to build a municipal plant and generate its own power.

A majority of his customers are Filipinos—only 40% of them being Americans. He thinks there would be more refrigerators sold if Filipino salesmen weren't on a quota basis. When they get their quota sold, they relax and take in cock fights the rest of the month.

He cursed the sealed unit like a hired hand would swear at a stubborn mule. He doubted if it would stand up, pointing a sealed unit out to me which was 12 months old and done for, another unit not sealed which is 12 years old and "good for another 12." He confessed, however, that if the sealed unit comes into vogue, the repair man will be out—which may be one of the causes of his indignation against sealed units.

Air conditioning in Manila has a great future, he believes. He was just starting to build a unit for the president's room of a hotel, using Frigidaire equipment. He has plans for many installations in the next few months in the various offices.

"There's a growing market in Manila—the pearl of the Orient where we have neither blizzards nor sunstrokes!" Mr. Day believes this firmly, and talks about it convincingly.

G-E OPERATIONS

General Electric of Manila, with 25% of its business in the refrigeration lines, is in doubt as to how to take all of the talk about immediate independence for the Philippines. They are not pushing the sales of refrigerators and have thus far left the air-conditioning market entirely to others.

"Maybe we're just laying low," suggested E. G. Bromilow, manager.

However, he asserts there is bound to be a natural increase of sales in the refrigeration and air-conditioning lines because of the general prosperity of Manila and the Philippines, and the growing demand.

Temporarily, the sale of G-E refrigerators has slipped, although there are 3,000 household units in use in Manila.

Mr. Bromilow told of how he had been in small nepa huts, where Filipinos had brand new electric refrigerators with nothing in them. They buy them because they are nice looking articles of furniture, and it gives them a chance to hold up their heads over their neighbors. Only gradually do they learn to use them, first by freezing ice cubes, etc.

G-E concentrates on the Filipino market, disregarding the few Americans who are only a handful compared to the 300,000 Filipinos in Manila.

While he believes gold is overspeculated, he figures there are

enough good mines and sufficient gold to last for at least six years. As for the effect of independence on business, he stated that General Electric would still be doing business no matter what happened. But he did cite the example of what happened in Japan where the formerly large G-E force has been cut down to a mere skeleton as Japan has edged out foreigners.

Pooler Heads International Technical Board

PARIS, France—Gardner Pooler, vice president of the American Society of Refrigerating Engineers and of Frosted Foods, Inc., has been elected head of the newly formed technical board of the International Institute du Froid.

King of Bulgaria Orders Fourth Crosley Unit

CINCINNATI — An order for a Crosley refrigerator to be used in the royal household of Bulgaria's King Boris III has just been received by A. G. Lindsay, manager of Crosley's export division, through Ing. K. Johnstcheff, Crosley distributor at Sofia, Bulgaria.

This is said to be the fourth Sheldor purchased by the king.

Athens News-Reel Theater Air Conditioned

ATHENS, Greece—Air conditioning is a feature of the 591-seat news-reel theater which has been constructed here, first of its kind in Athens.

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